

SSME ALTERNATE TURBOPUMP DEVELOPMENT PROGRAM (HPFTP)

VERIFICATION COMPLETE REPORT TURBINE INLET STRUT AERODYNAMIC DESIGN DVS DR NO. 3.1.2.2.4.1, VM NO. 4.1.2.4 A

JUNE 1989

Prepared under
NASA Contract NAS8-36801
DRL Sequence No. SE12
WBS No. 1.5.1.2

Prepared for
George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Marshall Space Flight Center, AL 35812

Prepared by
Pratt & Whitney
P. O. Box 109600
West Palm Beach, FL 33410-9600

(NASA-CR-183754) SSME ALTERNATE TURBOPUMP
DEVELOPMENT PROGRAM (HPFTP): VERIFICATION
COMPLETE REPORT TURBINE INLET STRUT
AERODYNAMIC DESIGN DVS DR NO. 3.1.2.2.4.1,
VM NO. 4.1.2.4 A (PWA) 54 p

N90-70129

Unclassified
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**UNITED
TECHNOLOGIES
PRATT&WHITNEY**

SSME ALTERNATE TURBOPUMP DEVELOPMENT PROGRAM (HPFTP)

VERIFICATION COMPLETE REPORT TURBINE INLET STRUT AERODYNAMIC DESIGN DVS DR NO. 3.1.2.2.4.1, VM NO. 4.1.2.4 A

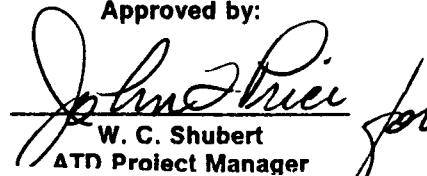
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Approved by:


W. C. Shubert
ATD Project Manager



HPFTP Turbine Aerodynamic Design

The High Pressure Fuel Turbopump (HPFTP) turbine aerodynamic design is based on the requirements defined by the Interface Control Document (ICD) and by the Power Balance Model, Table 387B. Performance Table 387B was used for the turbine aerodynamic design because its turbine flow capacities are consistent with the baseline turbine nozzle flow test results conducted on Pratt & Whitney's test stand, E-6, in December, 1986.

A conventional pressure-compounded, 2-stage turbine was chosen because of its inherent high efficiency over a wide range of steady-state operating conditions. No exit guide vane is required for the small (18 degrees) exit swirl angle. The high airfoil gas bending loads in the HPFTP turbine required thin wall, hollow airfoil sections, with larger moments of inertia, in order to reduce the airfoil bending stresses. The HPFTP turbine design has a mean diameter wheel speed of 1482 ft/sec which is compatible with allowable disk and root attachment stress criteria. This wheel speed also provides a high design point wheel speed to gas velocity ratio, assuring that there will not be a significant efficiency loss at minimum power level (MPL) operation. The design point velocity ratio, (0.55) is conservative, ensuring minimal aerodynamic risk. The design speed of approximately 36,500 rpm selected for the HPFTP was primarily set by the pump hydrodynamics. The height of the turbine annulus was selected to limit the last stage blade root centrifugal stress to 46,000 psi. This annulus size yielded a favorable exit Mach number of 0.18 and a low exit swirl angle of 18 degrees, therefore, this rpm was satisfactory to the performance, stress, and exit Mach number requirements of the turbine.

The methodology associated with the design of the HPFTP starts with the meanline design analysis. This analysis is based on the assumption that the flow through the turbine can be represented by the flow at the center of the flow passage. This simplified approach permits selection of the number of stages required, the mean diameter of the flow passage, and the annulus area. Included in the analysis is an estimate of the aerodynamic efficiency. This prediction system uses the physical laws of aerodynamics and correlations from rig and engine data to estimate profile loss, secondary loss, blade tip leakage, and shock and incidence losses based on the geometry and aerodynamic parameters of the turbine. An interactive graphic flowpath design system is used, in conjunction with the optimum meanline design, to generate candidate flowpath configurations.

The streamline design analysis is used to optimize the radial variation in the velocity triangles, once the average conditions are selected from the meanline analysis. This analysis calculates the flow characteristics at numerous radial locations and at the inlet and exit of each airfoil row. Once the meanline and streamline analyses have been used to optimize the velocity triangles throughout the turbine, 2 dimensional (2-D) airfoil sections are designed. These airfoil sections are designed to achieve contours that provide the desired amount of flow turning without permitting the flow to separate from

the airfoil surface. This process involves determining the static pressure distributions and boundary layer parameters along the airfoil surfaces and endwalls. An interactive graphics airfoil design system is used to identify adverse static pressure gradients such that the airfoil contour can be modified appropriately. After the 2-D airfoils are estimated at several spanwise locations, they are radially faired and combined with a preliminary endwall definition. An inviscid multi-stage 3-D flow analysis is then used to refine and optimize the entire flowpath configuration.

All turbine airfoil, endwall, inlet, and exit flow passage surfaces are contoured and refined as a system. The multi-stage feature enables a complete evaluation of potential changes to an individual surface contour during the design process. This assessment includes, not only flow property changes around the component being modified, but also around all upstream and downstream components in the complete turbine system. Improved performance and reduced risk result from this global optimization capability.

This report contains:

- o Hot elevation diagrams for each airfoil
- o 3-D airfoil plots
- o 2-D airfoil section plots
- o Tabulated airfoil section coordinates
- o A plot of hot gaging dimensions versus radius
- o A plot of percent change in flow area versus airfoil rotation
- o A plot of stress versus span
- o 3-D airfoil static pressure distributions
- o Airfoil Ps/PT and Mach number contours
- o A plot of suction surface boundary layer friction coefficient versus surface distance

SOME HAFTER INLET STRUT
AND DOME HOT ELEVATION

F (TDC)

F = FAT STRUT X=1.77H
T = THIN STRUT, X=1.33/3

22.5°

F (TYP)

VIEW A-A

X
SEE VIEW A-A

1.6313

AXIAL CHORD

0.6072

TIP DEFINING

SECTION A

5.300

R.

INLET STRUT

(FREE)

DOME

1.72 R.

2.931F
R.
RADIAL
REFERENCE
LINE

$(X, Y) = 0, 0, 0$

1.0106
R

0.120 R.
ELLIPSE MINOR AXIS

5.5531

ELLIPSE MAJOR AXIS

NOTES: 1. STRUT IS CONSTANT SECTION,
STACKED ON REF. LINE SHOWN.

2. NUMBER OF STRUTS IS 16. (4 THICK, 12 THIN)

3. ALL DIMENSIONS ARE AXLE

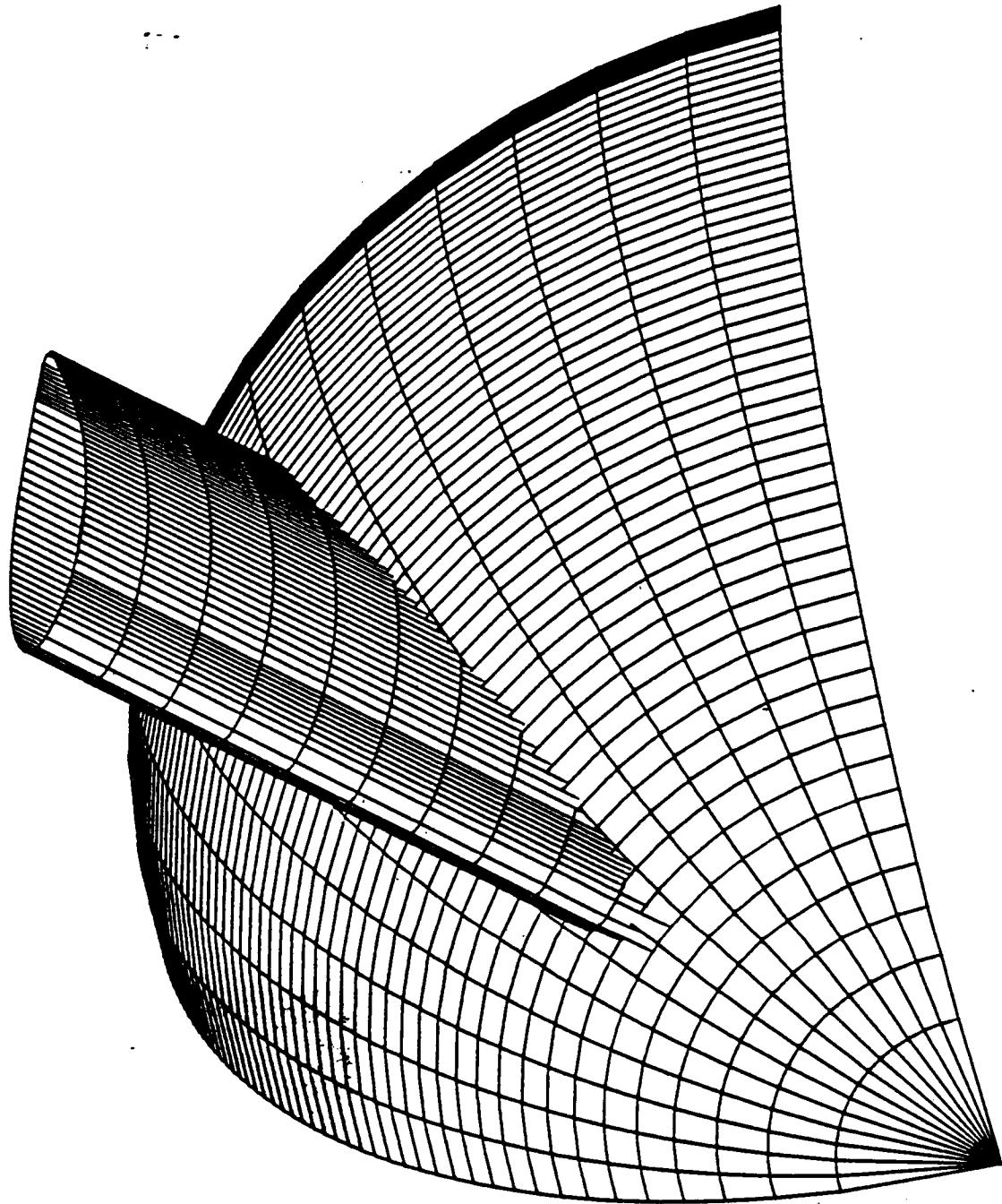
4. MATERIAL IS PHM 1422 DENS. = 6.347 PHS WT. = 0.245

5. AIRFIELD POLE COORDINATES
RESIDE IN RURPP2A FATSTRUT

AND RURPP2A THINSTRT

R.J.R. 8/19/87

3D PLOT



SSME FT...FINAL INLET STRUT FAIRING...R.

05/22/87 11:37:16
60.00 60.00 0.0

EXTERNAL C/ UR. TITLE - SSME FUEL TURBINE...R.J.ROMEY...11 87..THICK STRUTS...
 TD 0 REV. 0 PART NO. END NO. DA. J2/15/80 TIME 11:21:12 CYLINDRICAL
 SUBTITLE HOT RADIUS = 1.93070 COLD RADIUS = 0.0 THERMAL SHRINK FACTOR = 1.00000

PRETRUST NOT USED FOR TD PRINTOUT.

PCT X	X TOP	Y TOP	(CIRCLE)	X BOT	Y BOT	(CIRCLE)
0.0	-1.29222	-0.04953	-0.00020	-1.29222	0.04947	-0.00020
0.010	-1.26591	-0.09255	-0.08246	-1.26591	0.08214	0.08206
0.020	-1.23559	-0.11566	-0.123959	-1.23559	0.11559	
0.030	-1.21328	-0.14065	-0.121328	-1.21328	0.14059	
0.040	-1.18697	-0.16117	-0.18697	-1.18697	0.16110	
0.050	-1.16066	-0.18881	-0.16066	-1.16066	0.17875	
0.060	-1.13434	-0.19456	-0.13434	-1.13434	0.19430	
0.070	-1.10803	-0.20831	-0.10803	-1.10803	0.20825	
0.080	-1.08172	-0.22203	-0.08172	-1.08172	0.22087	
0.090	-1.05540	-0.23244	-0.05540	-1.05540	0.23238	
0.100	-1.02909	-0.24302	-0.02909	-1.02909	0.24296	
0.115	-0.96331	-0.2604	-0.06331	-0.96331	0.26580	
0.150	-0.89753	-0.2851	-0.09753	-0.89753	0.28504	
0.175	-0.83175	-0.30997	-0.83175	-0.83175	0.30091	
0.200	-0.76596	-0.31111	-0.76596	-0.76596	0.31405	
0.225	-0.70018	-0.32885	-0.70018	-0.70018	0.32479	
0.250	-0.63440	-0.33345	-0.63440	-0.63440	0.33338	
0.275	-0.56862	-0.34006	-0.56862	-0.56862	0.34000	
0.300	-0.50284	-0.34778	-0.50284	-0.50284	0.34472	
0.325	-0.43705	-0.34771	-0.43705	-0.43705	0.34764	
0.350	-0.37127	-0.34884	-0.37127	-0.37127	0.34878	
0.375	-0.30549	-0.34668	-0.30549	-0.30549	0.34862	
0.400	-0.23971	-0.34775	-0.23971	-0.23971	0.34768	
0.425	-0.17393	-0.34998	-0.17393	-0.17393	0.34591	
0.450	-0.10814	-0.36220	-0.10814	-0.10814	0.34313	
0.475	-0.04236	-0.33224	-0.04236	-0.04236	0.33917	
0.500	0.02342	-0.33395	0.02342	0.02342	0.33389	
0.525	0.08920	-0.32276	0.08920	0.08920	0.32719	
0.550	0.15498	-0.31109	0.15498	0.15498	0.31192	
0.575	0.22077	-0.30947	0.22077	0.22077	0.30941	
0.600	0.28655	-0.29851	0.28655	0.28655	0.29844	
0.625	0.35233	-0.28634	0.35233	0.35233	0.28628	
0.650	0.41811	-0.27313	0.41811	0.41811	0.27306	
0.675	0.48389	-0.25902	0.48389	0.48389	0.25896	
0.700	0.54967	-0.24417	0.54967	0.54967	0.24411	
0.725	0.61546	-0.22872	0.61546	0.61546	0.22865	
0.750	0.68124	-0.21276	0.68124	0.68124	0.21270	
0.775	0.74702	-0.19638	0.74702	0.74702	0.19632	
0.800	0.81280	-0.17968	0.81280	0.81280	0.17962	
0.825	0.87858	-0.16269	0.87858	0.87858	0.16263	
0.850	0.94437	-0.14545	0.94437	0.94437	0.14539	
0.875	1.01015	-0.12802	1.01015	1.01015	0.12796	
0.900	1.07593	-0.11043	1.07593	1.07593	0.11037	
0.910	1.10224	-0.10335	1.10224	1.10224	0.10329	
0.920	1.12856	-0.09625	1.12856	1.12856	0.09618	
0.930	1.15487	-0.08912	1.15487	1.15487	0.08906	
0.940	1.18118	-0.08198	1.18118	1.18118	0.08192	
0.950	1.20749	-0.07484	1.20749	1.20749	0.07476	
0.960	1.23381	-0.06765	1.23381	1.23381	0.06759	
0.970	1.26012	-0.06046	1.26012	1.26012	0.06040	
0.980	1.28643	-0.05325	1.28643	1.28643	0.05319	
0.990	1.31275	-0.04604	1.31275	1.31275	0.04598	0.04452
1.000	1.33906	-0.03874	1.33906	1.33906	0.03866	0.033276

NO. 1 CORE
TD 0
SUBTITLE

TURBINE REV. 0 PART NO. TITLE - SAME FUEL TURBINE...R.J. ROMEY...11
END NO. 02/15/88 TIME 11:21:12
HOT RADIUS = 1.92070 COLD RADIUS = 0.0 THERMAL SHRINK FACTOR = 1.000000

PRETRANS NOT USED FOR TO PRINTOUT.

PCT X	X TOP	Y TOP	(CIRCLE)	X BOT	Y BOT	(CIRCLE)
0.0	-1.20902	-0.08100	-0.00003	-1.20902	0.08097	-0.00003
0.010	-1.18583	-0.09634	-0.07720	-1.18583	0.0430	0.07715
0.020	-1.16263	-0.10768	-0.10412	-1.16263	0.10764	0.10407
0.030	-1.13944	-0.12101	-0.12102	-1.13944	0.12096	0.12097
0.040	-1.11625	-0.13416	-0.13416	-1.11625	0.13409	
0.050	-1.09305	-0.14676	-0.14676	-1.09305	0.14669	
0.060	-1.06986	-0.15854	-0.15854	-1.06986	0.15847	
0.070	-1.04667	-0.16948	-0.16948	-1.04667	0.16941	
0.080	-1.02348	-0.17963	-0.17963	-1.02348	0.17956	
0.090	-1.00028	-0.18902	-0.18902	-1.00028	0.18895	
0.100	-0.97709	-0.19767	-0.19767	-0.97709	0.19760	
0.125	-0.91911	-0.21632	-0.21632	-0.91911	0.21626	
0.150	-0.86113	-0.23176	-0.23176	-0.86113	0.23171	
0.175	-0.80314	-0.24496	-0.24496	-0.80314	0.24491	
0.200	-0.74516	-0.25614	-0.25614	-0.74516	0.25609	
0.225	-0.68718	-0.26543	-0.26543	-0.68718	0.26536	
0.250	-0.62920	-0.27294	-0.27294	-0.62920	0.27289	
0.275	-0.57121	-0.27891	-0.27891	-0.57121	0.27884	
0.300	-0.51323	-0.28337	-0.28337	-0.51323	0.28331	
0.325	-0.45525	-0.28631	-0.28631	-0.45525	0.28626	
0.350	-0.39727	-0.28778	-0.28778	-0.39727	0.28775	
0.375	-0.33928	-0.28814	-0.28814	-0.33928	0.28810	
0.400	-0.28130	-0.28773	-0.28773	-0.28130	0.28769	
0.425	-0.22332	-0.28668	-0.28668	-0.22332	0.28663	
0.450	-0.16534	-0.28491	-0.28491	-0.16534	0.28486	
0.475	-0.10735	-0.28235	-0.28235	-0.10735	0.28230	
0.500	-0.04937	-0.27886	-0.27886	-0.04937	0.27881	
0.525	0.00861	-0.27432	-0.27432	0.00861	0.27427	
0.550	0.06659	-0.26866	-0.26866	0.06659	0.26861	
0.575	0.12458	-0.26194	-0.26194	0.12458	0.26179	
0.600	0.18256	-0.25386	-0.25386	0.18256	0.25382	
0.625	0.24054	-0.24478	-0.24478	0.24054	0.24474	
0.650	0.29852	-0.23467	-0.23467	0.29852	0.23463	
0.675	0.35651	-0.22366	-0.22366	0.35651	0.22362	
0.700	0.41449	-0.21185	-0.21185	0.41449	0.21181	
0.725	0.47247	-0.19935	-0.19935	0.47247	0.19932	
0.750	0.53045	-0.18629	-0.18629	0.53045	0.18625	
0.775	0.58844	-0.17274	-0.17274	0.58844	0.17270	
0.800	0.64642	-0.15877	-0.15877	0.64642	0.15873	
0.825	0.70440	-0.14477	-0.14477	0.70440	0.14443	
0.850	0.76238	-0.12987	-0.12987	0.76238	0.12984	
0.875	0.82037	-0.11503	-0.11503	0.82037	0.11500	
0.900	0.87835	-0.09999	-0.09999	0.87835	0.09995	
0.910	0.90154	-0.09393	-0.09393	0.90154	0.09298	
0.920	0.92473	-0.08783	-0.08783	0.92473	0.08779	
0.930	0.94793	-0.08172	-0.08172	0.94793	0.08168	
0.940	0.97112	-0.07557	-0.07557	0.97112	0.07554	
0.950	0.99431	-0.06941	-0.06941	0.99431	0.06938	
0.960	1.01751	-0.06322	-0.06322	1.01751	0.06319	
0.970	1.04070	-0.05702	-0.05702	1.04070	0.05698	
0.980	1.06389	-0.05080	-0.05080	1.06389	0.05076	
0.990	1.08708	-0.04456	-0.04456	1.08708	0.04452	0.04217
1.000	1.11028	-0.03831	-0.03831	1.11028	0.03827	-0.00002

EXTERNAL C_I UR
TD 0 .- REV. 0 PART NO. END NO. TITLE - SSME FUEL TURBINE...R.J.RONEY...11
SUBTITLE HOT RADIUS = 5.200000 COLD RADIUS = 0.0 TIME 11:21:12 CYLINDRICAL
THERMAL SHRINK FACTOR = 1.000000

PRETWIST NOT USED FOR TD PRINTOUT.

PCT X	X TOP	Y TOP	(CIRCLE)	X BOT	Y BOT	(CIRCLE)
0.0	-1.29222	-0.04953	-0.00020	-1.29222	0.04947	-0.00020
0.010	-1.26591	-0.03255	-0.00246	-1.26591	0.08216	0.00206
0.020	-1.23959	-0.11566		-1.23959	0.11559	
0.030	-1.21328	-0.14065		-1.21328	0.14059	
0.040	-1.18697	-0.16117		-1.18697	0.16110	
0.050	-1.16066	-0.17881		-1.16066	0.17875	
0.060	-1.13434	-0.19436		-1.13434	0.19430	
0.070	-1.10803	-0.20831		-1.10803	0.20825	
0.080	-1.08172	-0.22202		-1.08172	0.22087	
0.090	-1.05540	-0.23244		-1.05540	0.23238	
0.100	-1.02909	-0.24302		-1.02909	0.24296	
0.125	-0.96331	-0.26604		-0.96331	0.26580	
0.150	-0.89753	-0.28511		-0.89753	0.28504	
0.175	-0.83175	-0.30075		-0.83175	0.30091	
0.200	-0.76596	-0.31411		-0.76596	0.31405	
0.225	-0.70016	-0.32485		-0.70016	0.32479	
0.250	-0.63440	-0.33345		-0.63440	0.33338	
0.275	-0.56862	-0.34006		-0.56862	0.34000	
0.300	-0.50284	-0.34478		-0.50284	0.34472	
0.325	-0.43705	-0.34771		-0.43705	0.34764	
0.350	-0.37127	-0.36884		-0.37127	0.36878	
0.375	-0.30549	-0.34660		-0.30549	0.34862	
0.400	-0.23971	-0.34775		-0.23971	0.34768	
0.425	-0.17393	-0.34598		-0.17393	0.34591	
0.450	-0.10814	-0.34320		-0.10814	0.34313	
0.475	-0.04236	-0.33924		-0.04236	0.33917	
0.500	0.02342	-0.33395		0.02342	0.33389	
0.525	0.08920	-0.32726		0.08920	0.32719	
0.550	0.15428	-0.31929		0.15428	0.31922	
0.575	0.22077	-0.30947		0.22077	0.30941	
0.600	0.28655	-0.29851		0.28655	0.29844	
0.625	0.35233	-0.28634		0.35233	0.28628	
0.650	0.41811	-0.27313		0.41811	0.27306	
0.675	0.48389	-0.25902		0.48389	0.25896	
0.700	0.54967	-0.24417		0.54967	0.24411	
0.725	0.61546	-0.22872		0.61546	0.22865	
0.750	0.68124	-0.21276		0.68124	0.21270	
0.775	0.74702	-0.19638		0.74702	0.19632	
0.800	0.81280	-0.17968		0.81280	0.17962	
0.825	0.87650	-0.16269		0.87650	0.16263	
0.850	0.94437	-0.14545		0.94437	0.14539	
0.875	1.01015	-0.12802		1.01015	0.12796	
0.900	1.07593	-0.11043		1.07593	0.11037	
0.910	1.10224	-0.10335		1.10224	0.10329	
0.920	1.12856	-0.09625		1.12856	0.09618	
0.930	1.15487	-0.08912		1.15487	0.08906	
0.940	1.18118	-0.08198		1.18118	0.08192	
0.950	1.20749	-0.07484		1.20749	0.07476	
0.960	1.23391	-0.06765		1.23391	0.06759	
0.970	1.26012	-0.06046		1.26012	0.06040	
0.980	1.28643	-0.05325		1.28643	0.05319	
0.990	1.31275	-0.04604	-0.04458	1.31275	0.04598	0.04452
1.000	1.33906	-0.03874	-0.00003	1.33906	0.03868	-0.00003

L.E. TOP TANG. PT. (X,Y)

-1.26353

-0.08569

L.E. BOTTOM TANG. PT. (X,Y)

-1.26381

0.08493

L.E. TOP TANG. PT. (X,Y)

1.30163

-0.04909

L.E. BOTTOM TANG. PT. (X,Y)

1.30163

0.04903

NOSE POINT (X,Y)

-1.29222

-0.00043

TAIL POINT (X,Y)

1.33206

-0.00003

NET CROSS-SECT. AREA (EXCL. COATING)

0.33906

GAGING (X,Y,LAMBDA)

0.17442

-0.31639

7.87950

GAGING ANGLE (DEG.)

74.723

CTR. OF GRAV. (INCL. COATING) (X,Y)

-0.00005

-0.00004

RAD. REF. PT. (X,Y)

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

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NO. 1 CORE
TO 0 REV.
SUBTITLE

TITLE - SSME FUEL TURBINE...R.J.RONEY...11
END NO. DA 02/15/88 TIME 11:21:12
HOT RADIUS = 5.20000 COLD RADIUS = 0.0
THERMAL SHRINK FACTOR = 1.00000

PRETWIST NOT USED FOR TD PRINTOUT.

PCT X	X TOP	Y TOP	(CIRCLE)	X BOT	Y BOT	(CIRCLE)
0.0	-1.20202	-0.08028	-0.00003	-1.20202	0.08024	-0.00003
0.010	-1.18583	-0.09431	-0.07718	-1.18583	0.09427	0.07713
0.020	-1.16263	-0.10765	-0.10410	-1.16263	0.10761	0.10405
0.030	-1.13944	-0.12098	-0.12099	-1.13944	0.12093	0.12094
0.040	-1.11625	-0.13413	-0.13413	-1.11625	0.13407	
0.050	-1.09305	-0.14674	-0.14674	-1.09305	0.14667	
0.060	-1.06986	-0.15852	-0.15852	-1.06986	0.15846	
0.070	-1.04667	-0.16946	-0.16946	-1.04667	0.16938	
0.080	-1.02348	-0.17961	-0.17961	-1.02348	0.17953	
0.090	-1.00026	-0.18999	-0.18999	-1.00026	0.18892	
0.100	-0.97709	-0.19764	-0.19764	-0.97709	0.19757	
0.125	-0.91911	-0.21621	-0.21621	-0.91911	0.21624	
0.150	-0.86113	-0.23174	-0.23174	-0.86113	0.23169	
0.175	-0.80314	-0.24494	-0.24494	-0.80314	0.24489	
0.200	-0.74516	-0.25612	-0.25612	-0.74516	0.25607	
0.225	-0.68718	-0.26540	-0.26540	-0.68718	0.26534	
0.250	-0.62920	-0.27293	-0.27293	-0.62920	0.27287	
0.275	-0.57121	-0.27889	-0.27889	-0.57121	0.27882	
0.300	-0.51323	-0.28336	-0.28336	-0.51323	0.28329	
0.325	-0.45525	-0.28631	-0.28631	-0.45525	0.28624	
0.350	-0.39727	-0.28772	-0.28772	-0.39727	0.28772	
0.375	-0.33928	-0.28814	-0.28814	-0.33928	0.28808	
0.400	-0.28130	-0.28773	-0.28773	-0.28130	0.28767	
0.425	-0.22332	-0.28666	-0.28666	-0.22332	0.28661	
0.450	-0.16534	-0.28491	-0.28491	-0.16534	0.28484	
0.475	-0.10735	-0.28235	-0.28235	-0.10735	0.28228	
0.500	-0.04937	-0.27886	-0.27886	-0.04937	0.27879	
0.525	0.00861	-0.27432	-0.27432	0.00861	0.27425	
0.550	0.06659	-0.26966	-0.26966	0.06659	0.26859	
0.575	0.12458	-0.26184	-0.26184	0.12458	0.26177	
0.600	0.18256	-0.25386	-0.25386	0.18256	0.25379	
0.625	0.24054	-0.24470	-0.24470	0.24054	0.24471	
0.650	0.29852	-0.23467	-0.23467	0.29852	0.23461	
0.675	0.35651	-0.22336	-0.22336	0.35651	0.22360	
0.700	0.41449	-0.21185	-0.21185	0.41449	0.21179	
0.725	0.47247	-0.19935	-0.19935	0.47247	0.19930	
0.750	0.53045	-0.18629	-0.18629	0.53045	0.18623	
0.775	0.58844	-0.17274	-0.17274	0.58844	0.17267	
0.800	0.64642	-0.15977	-0.15977	0.64642	0.15871	
0.825	0.70440	-0.14447	-0.14447	0.70440	0.14441	
0.850	0.76238	-0.12987	-0.12987	0.76238	0.12981	
0.875	0.82037	-0.11503	-0.11503	0.82037	0.11497	
0.900	0.87835	-0.09999	-0.09999	0.87835	0.09993	
0.910	0.90154	-0.09393	-0.09393	0.90154	0.09387	
0.920	0.92473	-0.08783	-0.08783	0.92473	0.08777	
0.930	0.94793	-0.08172	-0.08172	0.94793	0.08166	
0.940	0.97112	-0.07557	-0.07557	0.97112	0.07551	
0.950	0.99431	-0.06941	-0.06941	0.99431	0.06935	
0.960	1.01751	-0.06322	-0.06322	1.01751	0.06316	
0.970	1.04070	-0.05702	-0.05702	1.04070	0.05696	
0.980	1.06399	-0.05080	-0.05080	1.06389	0.05074	
0.990	1.08708	-0.04456	-0.04456	1.08708	0.04450	0.044215
1.000	1.11028	-0.03831	-0.03831	1.11028	0.03825	-0.00003

EXTERNAL 1 OUR TITLE - SSME FUEL TURBINE...R.J.RONEY...1
 TD 0 .J REV. 0 PART NO. END NO. DA. 02/15/88 TIME 11:22:09
 SUBTITLE HOT RADIUS = 1.93070 COLD RADIUS = 0.0 THERMAL SHRINK FACTOR = 1.00000

PRETRANS NOT USED FOR TD PRINTOUT.

PCT X	X TOP	Y TOP	(CIRCLE)	X BOT	Y BOT	(CIRCLE)
0.0	-1.33127	-0.04203	-0.00000	-1.33127	0.04203	-0.00000
0.010	-1.30496	-0.05274	-0.04998	-1.30496	0.05273	0.04998
0.020	-1.27864	-0.06059	-0.05864	-1.27864	0.06059	
0.030	-1.25233	-0.06631	-0.125233	-1.25233	0.06631	
0.040	-1.22602	-0.07143	-0.122602	-1.22602	0.07142	
0.050	-1.19971	-0.07614	-0.119971	-1.19971	0.07613	
0.060	-1.17339	-0.08041	-0.117339	-1.17339	0.08041	
0.070	-1.14708	-0.08430	-0.114708	-1.14708	0.08430	
0.080	-1.12077	-0.08789	-0.112077	-1.12077	0.08789	
0.090	-1.09446	-0.09123	-0.109446	-1.09446	0.09123	
0.100	-1.06814	-0.09434	-0.106814	-1.06814	0.09434	
0.125	-1.00236	-0.10119	-0.100236	-1.00236	0.10119	
0.150	-0.93658	-0.10697	-0.93658	-0.93658	0.10696	
0.175	-0.87080	-0.11181	-0.87080	-0.87080	0.11181	
0.200	-0.80502	-0.11585	-0.80502	-0.80502	0.11585	
0.225	-0.73923	-0.11916	-0.73923	-0.73923	0.11917	
0.250	-0.67345	-0.12183	-0.67345	-0.67345	0.12183	
0.275	-0.60767	-0.12386	-0.60767	-0.60767	0.12386	
0.300	-0.54189	-0.12531	-0.54189	-0.54189	0.12530	
0.325	-0.47611	-0.12619	-0.47611	-0.47611	0.12619	
0.350	-0.41033	-0.12650	-0.41033	-0.41033	0.12650	
0.375	-0.34454	-0.12644	-0.34454	-0.34454	0.12643	
0.400	-0.27876	-0.12622	-0.27876	-0.27876	0.12622	
0.425	-0.21298	-0.12584	-0.21298	-0.21298	0.12583	
0.450	-0.14720	-0.12530	-0.14720	-0.14720	0.12530	
0.475	-0.08142	-0.12462	-0.08142	-0.08142	0.12461	
0.500	-0.01564	-0.12376	-0.01564	-0.01564	0.12376	
0.525	0.05015	-0.12274	0.05015	0.05015	0.12274	
0.550	0.11593	-0.12156	0.11593	0.11593	0.12155	
0.575	0.18171	-0.12019	0.18171	0.18171	0.12019	
0.600	0.24749	-0.11865	0.24749	0.24749	0.11865	
0.625	0.31327	-0.11692	0.31327	0.31327	0.11692	
0.650	0.37905	-0.11500	0.37905	0.37905	0.11499	
0.675	0.44484	-0.11286	0.44484	0.44484	0.11286	
0.700	0.51062	-0.11051	0.51062	0.51062	0.11050	
0.725	0.57640	-0.10793	0.57640	0.57640	0.10792	
0.750	0.64218	-0.10510	0.64218	0.64218	0.10509	
0.775	0.70796	-0.10200	0.70796	0.70796	0.10199	
0.800	0.77374	-0.09861	0.77374	0.77374	0.09860	
0.825	0.83953	-0.09488	0.83953	0.83953	0.09487	
0.850	0.90531	-0.09079	0.90531	0.90531	0.09078	
0.875	0.97109	-0.08628	0.97109	0.97109	0.08627	
0.900	1.03687	-0.08128	1.03687	1.03687	0.08126	
0.910	1.06318	-0.07912	1.06318	1.06318	0.07911	
0.920	1.08950	-0.07685	1.08950	1.08950	0.07684	
0.930	1.11581	-0.07449	1.11581	1.11581	0.07449	
0.940	1.14212	-0.07204	1.14212	1.14212	0.07203	
0.950	1.16844	-0.06939	1.16844	1.16844	0.06939	
0.960	1.19475	-0.06647	1.19475	1.19475	0.06647	
0.970	1.22106	-0.06336	1.22106	1.22106	0.06335	
0.980	1.24737	-0.06018	1.24737	1.24737	0.06018	0.06017
0.990	1.27369	-0.05706	1.27369	1.27369	0.05706	0.05003
1.000	1.30000	-0.05401	1.30000	1.30000	0.05401	0.00000

NO. 1 CORI NIVOUR
TD 0 REV. 0 PART NO.
SUBTITLE

TITLE - SAME FUEL TURBINE...R.J.RONEY...1
END NO.
HOT RADIUS = 1.93070 COLD RADIUS = 0.0
TIME 11:22:09 THERMAL SHRINK FACTOR = 1.00000

PRETMIST NOT USED FOR TD PRINTOUT.

PCT X	X TOP	Y TOP	(CIRCLE)	X BOT	Y BOT	(CIRCLE)
0.0	-1.12327	-0.02723	0.00000	-1.12327	0.02723	0.00000
0.010	-1.10277	-0.02949	-0.02874	-1.10277	0.02949	0.02874
0.020	-1.08227	-0.03173		-1.08227	0.03173	
0.030	-1.06177	-0.03396		-1.06177	0.03396	
0.040	-1.04127	-0.03616		-1.04127	0.03616	
0.050	-1.02077	-0.03829		-1.02077	0.03829	
0.060	-1.00027	-0.04032		-1.00027	0.04032	
0.070	-0.97977	-0.04225		-0.97977	0.04224	
0.080	-0.95927	-0.04409		-0.95927	0.04408	
0.090	-0.93877	-0.04594		-0.93877	0.04593	
0.100	-0.91827	-0.04750		-0.91827	0.04749	
0.125	-0.86702	-0.05125		-0.86702	0.05125	
0.150	-0.81577	-0.05448		-0.81577	0.05447	
0.175	-0.76452	-0.05722		-0.76452	0.05721	
0.200	-0.71327	-0.05955		-0.71327	0.05954	
0.225	-0.66202	-0.06150		-0.66202	0.06149	
0.250	-0.61077	-0.06308		-0.61077	0.06307	
0.275	-0.55952	-0.06427		-0.55952	0.06426	
0.300	-0.50827	-0.06508		-0.50827	0.06507	
0.325	-0.45702	-0.06556		-0.45702	0.06556	
0.350	-0.40577	-0.06578		-0.40577	0.06576	
0.375	-0.35452	-0.06580		-0.35452	0.06579	
0.400	-0.30327	-0.06565		-0.30327	0.06564	
0.425	-0.25202	-0.06536		-0.25202	0.06537	
0.450	-0.20077	-0.06502		-0.20077	0.06501	
0.475	-0.14952	-0.06459		-0.14952	0.06458	
0.500	-0.09827	-0.06408		-0.09827	0.06407	
0.525	-0.04702	-0.06347		-0.04702	0.06346	
0.550	0.00423	-0.06275		0.00423	0.06274	
0.575	0.05543	-0.06193		0.05543	0.06192	
0.600	0.10673	-0.06100		0.10673	0.06099	
0.625	0.15798	-0.05997		0.15798	0.05996	
0.650	0.20923	-0.05893		0.20923	0.05893	
0.675	0.26048	-0.05758		0.26048	0.05758	
0.700	0.31173	-0.05622		0.31173	0.05622	
0.725	0.36298	-0.05473		0.36298	0.05473	
0.750	0.41423	-0.05312		0.41423	0.05313	
0.775	0.46548	-0.05139		0.46548	0.05138	
0.800	0.51673	-0.04951		0.51673	0.04951	
0.825	0.56798	-0.04750		0.56798	0.04749	
0.850	0.61923	-0.04534		0.61923	0.04533	
0.875	0.67048	-0.04302		0.67048	0.04301	
0.900	0.72173	-0.04053		0.72173	0.04052	
0.910	0.74223	-0.03948		0.74223	0.03947	
0.920	0.76273	-0.03839		0.76273	0.03838	
0.930	0.78323	-0.03728		0.78323	0.03727	
0.940	0.80373	-0.03613		0.80373	0.03612	
0.950	0.82423	-0.03495		0.82423	0.03494	
0.960	0.84473	-0.03373		0.84473	0.03372	
0.970	0.86523	-0.03247		0.86523	0.03246	
0.980	0.88573	-0.03118		0.88573	0.03117	
0.990	0.90623	-0.02985		0.90623	0.02984	0.02876
1.000	0.92673	-0.02848		0.92673	0.02847	-0.00000

EXTERNAL 1 OUR TITLE - SAME FUEL TURBINE...R.J.RONEY...1 '-87...TWIN STRUTS...
 TD 0 REV. 0 PART NO. END NO. D... 02/15/88 TIME 11:22:09 CYLINDRICAL
 SUBTITLE HOT RADIUS = 0.0 COLD RADIUS = 0.0 THERMAL SHRINK FACTOR = 1.00000

PARTIST NOT USED FOR TD PRINTOUT.

PCT X	X TOP	Y TOP	(CIRCLE)	X BOT	Y BOT	(CIRCLE)
0.0	-1.33127	-0.04298	-0.00000	-1.33127	0.04208	-0.00000
0.010	-1.30496	-0.05274	-0.04998	-1.30496	0.05273	0.04998
0.020	-1.27864	-0.06059	-1.27864	0.06059		
0.030	-1.25233	-0.06631	-1.25233	0.06631		
0.040	-1.22602	-0.07143	-1.22602	0.07142		
0.050	-1.19971	-0.07614	-1.19971	0.07613		
0.060	-1.17339	-0.08041	-1.17339	0.08041		
0.070	-1.14708	-0.08430	-1.14708	0.08430		
0.080	-1.12077	-0.08789	-1.12077	0.08789		
0.090	-1.09446	-0.09123	-1.09446	0.09123		
0.100	-1.06814	-0.09434	-1.06814	0.09434		
0.125	-1.00236	-0.10119	-1.00236	0.10119		
0.150	-0.93658	-0.10697	-0.93658	0.10697		
0.175	-0.87080	-0.11181	-0.87080	0.11181		
0.200	-0.80502	-0.11585	-0.80502	0.11585		
0.225	-0.73923	-0.11918	-0.73923	0.11917		
0.250	-0.67345	-0.12183	-0.67345	0.12183		
0.275	-0.60767	-0.12386	-0.60767	0.12386		
0.300	-0.54189	-0.12531	-0.54189	0.12530		
0.325	-0.47611	-0.12619	-0.47611	0.12619		
0.350	-0.41033	-0.12650	-0.41033	0.12650		
0.375	-0.34454	-0.12644	-0.34454	0.12643		
0.400	-0.27876	-0.12622	-0.27876	0.12622		
0.425	-0.21298	-0.12584	-0.21298	0.12583		
0.450	-0.14720	-0.12530	-0.14720	0.12530		
0.475	-0.08142	-0.12462	-0.08142	0.12461		
0.500	-0.01564	-0.12376	-0.01564	0.12276		
0.525	0.05015	-0.12274	0.05015	0.12274		
0.550	0.11593	-0.12166	0.11593	0.12155		
0.575	0.18171	-0.12019	0.18171	0.12019		
0.600	0.24749	-0.11865	0.24749	0.11865		
0.625	0.31327	-0.11692	0.31327	0.11692		
0.650	0.37905	-0.11500	0.37905	0.11499		
0.675	0.44484	-0.11286	0.44484	0.11286		
0.700	0.51062	-0.11051	0.51062	0.11050		
0.725	0.57640	-0.10793	0.57640	0.10792		
0.750	0.64218	-0.10510	0.64218	0.10509		
0.775	0.70796	-0.10200	0.70796	0.10199		
0.800	0.77374	-0.09861	0.77374	0.09860		
0.825	0.83953	-0.09488	0.83953	0.09487		
0.850	0.90531	-0.09079	0.90531	0.09078		
0.875	0.97109	-0.08628	0.97109	0.08627		
0.900	1.03687	-0.08128	1.03687	0.08128		
0.910	1.06318	-0.07912	1.06318	0.07911		
0.920	1.08950	-0.07685	1.08950	0.07684		
0.930	1.11581	-0.07449	1.11581	0.07449		
0.940	1.14212	-0.07204	1.14212	0.07203		
0.950	1.16844	-0.06939	1.16844	0.06939		
0.960	1.19475	-0.06647	1.19475	0.06647		
0.970	1.22106	-0.06356	1.22106	0.06355		
0.980	1.24737	-0.06018	1.24737	0.06018	0.06017	
0.990	1.27359	-0.05706	1.27359	0.05706	0.05003	
1.000	1.30000	-0.05401	1.30000	0.05401	0.00000	

NO. 1 CORI NETOUR TITLE - SAME FUEL TURBINE...R.J. ROWE...1
 TD 6 REV. 0 PART NO. END NO. D. 02/15/88 TIME 11:22:09
 SUBTITLE HOT RADIUS = 5.20000 COLD RADIUS = 0.0 THERMAL SHRINK FACTOR = 1.00000

PRETMIST NOT USED FOR TD PRINTOUT.

PCT X	X TOP	Y TOP	(CIRCLE)	X BOT	Y BOT	(CIRCLE)
0.0	-1.12327	-0.02721	0.00000	-1.12327	0.02721	0.00000
0.010	-1.10277	-0.02947	-0.02672	-1.10277	0.02947	0.02672
0.020	-1.08227	-0.03171	-0.03171	-1.08227	0.03171	-0.03171
0.030	-1.06177	-0.03394	-0.03394	-1.06177	0.03394	-0.03394
0.040	-1.04127	-0.03614	-0.03614	-1.04127	0.03614	-0.03614
0.050	-1.02077	-0.03827	-0.03827	-1.02077	0.03827	-0.03827
0.060	-1.00027	-0.04030	-0.04030	-1.00027	0.04030	-0.04030
0.070	-0.97977	-0.04222	-0.97977	0.04222	-0.97977	-0.04222
0.080	-0.95927	-0.04406	-0.95927	0.04406	-0.95927	-0.04406
0.090	-0.93877	-0.04581	-0.93877	0.04581	-0.93877	-0.04581
0.100	-0.91827	-0.04747	-0.91827	0.04747	-0.91827	-0.04747
0.125	-0.86702	-0.05123	-0.86702	0.05123	-0.86702	-0.05123
0.150	-0.81577	-0.05445	-0.81577	0.05445	-0.81577	-0.05445
0.175	-0.76452	-0.05720	-0.76452	0.05720	-0.76452	-0.05720
0.200	-0.71327	-0.05953	-0.71327	0.05953	-0.71327	-0.05953
0.225	-0.66202	-0.06148	-0.66202	0.06148	-0.66202	-0.06148
0.250	-0.61077	-0.06305	-0.61077	0.06305	-0.61077	-0.06305
0.275	-0.55952	-0.06424	-0.55952	0.06424	-0.55952	-0.06424
0.300	-0.50827	-0.06506	-0.50827	0.06506	-0.50827	-0.06506
0.325	-0.45702	-0.06554	-0.45702	0.06554	-0.45702	-0.06554
0.350	-0.40577	-0.06576	-0.40577	0.06576	-0.40577	-0.06576
0.375	-0.35452	-0.06578	-0.35452	0.06578	-0.35452	-0.06578
0.400	-0.30327	-0.06564	-0.30327	0.06564	-0.30327	-0.06564
0.425	-0.25202	-0.06538	-0.25202	0.06538	-0.25202	-0.06538
0.450	-0.20077	-0.06502	-0.20077	0.06502	-0.20077	-0.06502
0.475	-0.14952	-0.06459	-0.14952	0.06459	-0.14952	-0.06459
0.500	-0.09827	-0.06408	-0.09827	0.06408	-0.09827	-0.06408
0.525	-0.04702	-0.06347	-0.04702	0.06347	-0.04702	-0.06347
0.550	0.00423	-0.06275	0.00423	0.06275	0.00423	0.06275
0.575	0.05548	-0.06193	0.05548	0.06193	0.05548	0.06193
0.600	0.10673	-0.06100	0.10673	0.06100	0.10673	0.06100
0.625	0.15798	-0.05997	0.15798	0.05997	0.15798	0.05997
0.650	0.20923	-0.05883	0.20923	0.05883	0.20923	0.05883
0.675	0.26048	-0.05758	0.26048	0.05758	0.26048	0.05758
0.700	0.31173	-0.05622	0.31173	0.05622	0.31173	0.05622
0.725	0.36298	-0.05473	0.36298	0.05473	0.36298	0.05473
0.750	0.41423	-0.05312	0.41423	0.05312	0.41423	0.05312
0.775	0.46548	-0.05139	0.46548	0.05139	0.46548	0.05139
0.800	0.51673	-0.04951	0.51673	0.04951	0.51673	0.04951
0.825	0.56798	-0.04750	0.56798	0.04750	0.56798	0.04750
0.850	0.61923	-0.04534	0.61923	0.04534	0.61923	0.04534
0.875	0.67048	-0.04302	0.67048	0.04302	0.67048	0.04302
0.900	0.72173	-0.04063	0.72173	0.04063	0.72173	0.04063
0.910	0.74223	-0.03948	0.74223	0.03948	0.74223	0.03948
0.920	0.76273	-0.03839	0.76273	0.03839	0.76273	0.03839
0.930	0.78323	-0.03728	0.78323	0.03728	0.78323	0.03728
0.940	0.80373	-0.03613	0.80373	0.03613	0.80373	0.03613
0.950	0.82423	-0.03495	0.82423	0.03495	0.82423	0.03495
0.960	0.84473	-0.03373	0.84473	0.03373	0.84473	0.03373
0.970	0.86523	-0.03247	0.86523	0.03247	0.86523	0.03247
0.980	0.88573	-0.03118	0.88573	0.03118	0.88573	0.03118
0.990	0.90623	-0.02985	0.90623	0.02985	0.90623	0.02985
1.000	0.92673	-0.02848	0.92673	0.02848	0.92673	0.02848

SOME ATO HPFP INLET FLOWPATH NOT COORDINATES

X-INNER	R-INNER	X-OUTER	R-OUTER	
-4.44458	0.00290	-4.44458	5.20000	DOME L.E., I.D. ELLIPSE
-4.44020	0.16359	-4.44020	5.20000	
-4.43583	0.23129	-4.43583	5.20000	MAJOR AXIS
-4.43145	0.28322	-4.43145	5.20000	
-4.42707	0.32697	-4.42707	5.20000	
-4.42269	0.36548	-4.42269	5.20000	
-4.41831	0.40028	-4.41831	5.20000	
-4.41393	0.43227	-4.41393	5.20000	
-4.40956	0.46203	-4.40956	5.20000	
-4.40518	0.48995	-4.40518	5.20000	
-4.40080	0.51335	-4.40080	5.20000	
-4.39642	0.54145	-4.39642	5.20000	
-4.39204	0.56541	-4.39204	5.20000	
-4.38766	0.58838	-4.38766	5.20000	
-4.38329	0.61047	-4.38329	5.20000	
-4.37891	0.63177	-4.37891	5.20000	
-4.37453	0.65236	-4.37453	5.20000	
-4.37015	0.67231	-4.37015	5.20000	
-4.36577	0.69166	-4.36577	5.20000	
-4.36139	0.71047	-4.36139	5.20000	
-4.35702	0.72878	-4.35702	5.20000	
-4.35264	0.74663	-4.35264	5.20000	
-4.34826	0.76405	-4.34826	5.20000	
-4.34388	0.78106	-4.34388	5.20000	
-4.33950	0.79771	-4.33950	5.20000	
-4.33512	0.81399	-4.33512	5.20000	
-4.33075	0.82995	-4.33075	5.20000	
-4.32637	0.84559	-4.32637	5.20000	
-4.32199	0.86094	-4.32199	5.20000	
-4.31761	0.87600	-4.31761	5.20000	
-4.31323	0.89079	-4.31323	5.20000	
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-4.30010	0.93371	-4.30010	5.20000	
-4.29572	0.94757	-4.29572	5.20000	
-4.29134	0.96121	-4.29134	5.20000	
-4.28696	0.97465	-4.28696	5.20000	
-4.28259	0.98790	-4.28259	5.20000	
-4.27821	1.00095	-4.27821	5.20000	
-4.27383	1.01384	-4.27383	5.20000	
-4.26945	1.02655	-4.26945	5.20000	
-4.26507	1.03909	-4.26507	5.20000	
-4.26069	1.05167	-4.26069	5.20000	
-4.25632	1.06371	-4.25632	5.20000	
-4.25194	1.07579	-4.25194	5.20000	
-4.24756	1.08773	-4.24756	5.20000	
-4.24318	1.09952	-4.24318	5.20000	
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-4.19064	1.23166	-4.19064	5.20000
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STRUCT L.E.

FILE: PJR T DOME 01 PRATT AND WHITNEY ED / S PAGE 00008

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FILE: RMMI - DOME 01 PRATT AND WHITNEY ED/S PAGE 00009

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FILE: RJR T DNE D1 PRATT AND WHITNEY EDS PAGE 00010

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FILE: RJRI ? DONE D1 PRATT AND WHITNEY ED/S PAGE 00011

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FILE: RNRI * DONE 01 PRATT AND WHITNEY ED/S PAGE 00012

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FILE: RJRI - DOME D1 PRATT AND WHITNEY EDS / S PAGE 00017

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FILE: RRI : DOME 01 PRATT AND WHITNEY EDS / S PAGE 00016

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-0.26777	3.99146	-0.26777	5.20000
-0.26339	3.99229	-0.26339	5.20000
-0.25901	3.99312	-0.25901	5.20000
-0.25463	3.99394	-0.25463	5.20000
-0.25026	3.99476	-0.25026	5.20000
-0.24588	3.99558	-0.24588	5.20000
-0.24150	3.99639	-0.24150	5.20000
-0.23712	3.99721	-0.23712	5.20000
-0.23275	3.99802	-0.23275	5.20000
-0.22837	3.99882	-0.22837	5.20000
-0.22399	3.99963	-0.22399	5.20000
-0.21961	4.00043	-0.21961	5.20000
-0.21523	4.00123	-0.21523	5.20000
-0.21086	4.00203	-0.21086	5.20000
-0.20648	4.00282	-0.20648	5.20000
-0.20210	4.00361	-0.20210	5.20000
-0.19772	4.00440	-0.19772	5.20000
-0.19335	4.00518	-0.19335	5.20000
-0.18897	4.00596	-0.18897	5.20000
-0.18459	4.00674	-0.18459	5.20000
-0.18021	4.00752	-0.18021	5.20000
-0.17583	4.00829	-0.17583	5.20000
-0.17146	4.00906	-0.17146	5.20000
-0.16708	4.00983	-0.16708	5.20000
-0.16270	4.01060	-0.16270	5.20000
-0.15832	4.01136	-0.15832	5.20000
-0.15395	4.01211	-0.15395	5.20000
-0.14957	4.01287	-0.14957	5.20000
-0.14519	4.01363	-0.14519	5.20000
-0.14081	4.01438	-0.14081	5.20000

FILE: RJRI - DONE 01 PRATT AND WHITNEY EDS PAGE 00019

-0.13644	4.01513	-0.13644	5.20000
-0.13206	4.01587	-0.13206	5.20000
-0.12768	4.01662	-0.12768	5.20000
-0.12330	4.01736	-0.12330	5.20000
-0.11892	4.01810	-0.11892	5.20000
-0.11455	4.01883	-0.11455	5.20000
-0.11017	4.01956	-0.11017	5.20000
-0.10579	4.02029	-0.10579	5.20000
-0.10141	4.02102	-0.10141	5.20000
-0.09704	4.02174	-0.09704	5.20000
-0.09266	4.02246	-0.09266	5.20000
-0.08828	4.02318	-0.08828	5.20000
-0.08390	4.02389	-0.08390	5.20000
-0.07952	4.02461	-0.07952	5.20000
-0.07515	4.02532	-0.07515	5.20000
-0.07077	4.02602	-0.07077	5.20000
-0.06639	4.02673	-0.06639	5.20000
-0.06201	4.02743	-0.06201	5.20000
-0.05764	4.02813	-0.05764	5.20000
-0.05326	4.02883	-0.05326	5.20000
-0.04888	4.02952	-0.04888	5.20000
-0.04450	4.03021	-0.04450	5.20000
-0.04013	4.03090	-0.04013	5.20000
-0.03575	4.03158	-0.03575	5.20000
-0.03137	4.03227	-0.03137	5.20000
-0.02699	4.03294	-0.02699	5.20000
-0.02261	4.03362	-0.02261	5.20000
-0.01824	4.03430	-0.01824	5.20000
-0.01386	4.03497	-0.01386	5.20000
-0.00948	4.03564	-0.00948	5.20000
-0.00510	4.03630	-0.00510	5.20000
-0.00073	4.03697	-0.00073	5.20000
0.00365	4.03763	0.00365	5.20000
0.00803	4.03829	0.00803	5.20000
0.01241	4.03894	0.01241	5.20000
0.01678	4.03959	0.01678	5.20000
0.02116	4.04024	0.02116	5.20000
0.02554	4.04089	0.02554	5.20000
0.02992	4.04153	0.02992	5.20000
0.03430	4.04218	0.03430	5.20000
0.03867	4.04282	0.03867	5.20000
0.04305	4.04345	0.04305	5.20000
0.04743	4.04409	0.04743	5.20000
0.05181	4.04471	0.05181	5.20000
0.05618	4.04534	0.05618	5.20000
0.06056	4.04597	0.06056	5.20000
0.06494	4.04659	0.06494	5.20000
0.06932	4.04721	0.06932	5.20000
0.07370	4.04783	0.07370	5.20000
0.07807	4.04845	0.07807	5.20000
0.08245	4.04906	0.08245	5.20000
0.08683	4.04967	0.08683	5.20000
0.09121	4.05027	0.09121	5.20000
0.09558	4.05088	0.09558	5.20000
0.09996	4.05146	0.09996	5.20000

FILE: RJRJ F DONE D1 PRATT AND WHITNEY EDS PAGE 00020

0.10434	4.05208	0.10434	5.20000
0.10872	4.05267	0.10872	5.20000
0.11309	4.05326	0.11309	5.20000
0.11747	4.05386	0.11747	5.20000
0.12185	4.05444	0.12185	5.20000
0.12623	4.05503	0.12623	5.20000
0.13060	4.05561	0.13060	5.20000
0.13498	4.05619	0.13498	5.20000
0.13936	4.05677	0.13936	5.20000
0.14374	4.05734	0.14374	5.20000
0.14812	4.05791	0.14812	5.20000
0.15249	4.05848	0.15249	5.20000
0.15687	4.05905	0.15687	5.20000
0.16125	4.05961	0.16125	5.20000
0.16563	4.06017	0.16563	5.20000
0.17000	4.06073	0.17000	5.20000
0.17438	4.06129	0.17438	5.20000
0.17876	4.06184	0.17876	5.20000
0.18314	4.06239	0.18314	5.20000
0.18751	4.06294	0.18751	5.20000
0.19189	4.06348	0.19189	5.20000
0.19627	4.06402	0.19627	5.20000
0.20065	4.06457	0.20065	5.20000
0.20502	4.06510	0.20502	5.20000
0.20940	4.06564	0.20940	5.20000
0.21376	4.06617	0.21376	5.20000
0.21816	4.06670	0.21816	5.20000
0.22254	4.06722	0.22254	5.20000
0.22691	4.06775	0.22691	5.20000
0.23129	4.06827	0.23129	5.20000
0.23567	4.06879	0.23567	5.20000
0.24005	4.06930	0.24005	5.20000
0.24442	4.06982	0.24442	5.20000
0.24880	4.07032	0.24880	5.20000
0.25318	4.07083	0.25318	5.20000
0.25756	4.07134	0.25756	5.20000
0.26193	4.07184	0.26193	5.20000
0.26631	4.07234	0.26631	5.20000
0.27069	4.07284	0.27069	5.20000
0.27507	4.07333	0.27507	5.20000
0.27945	4.07382	0.27945	5.20000
0.28382	4.07431	0.28382	5.20000
0.28820	4.07480	0.28820	5.20000
0.29258	4.07528	0.29258	5.20000
0.29696	4.07576	0.29696	5.20000
0.30133	4.07624	0.30133	5.20000
0.30571	4.07672	0.30571	5.20000
0.31009	4.07719	0.31009	5.20000
0.31447	4.07766	0.31447	5.20000
0.31884	4.07813	0.31884	5.20000
0.32322	4.07859	0.32322	5.20000
0.32760	4.07906	0.32760	5.20000
0.33198	4.07952	0.33198	5.20000
0.33635	4.07997	0.33635	5.20000
0.34073	4.08043	0.34073	5.20000

0.34511	4.08086	0.34511	5.20000
0.34949	4.08133	0.34949	5.20000
0.35387	4.08178	0.35387	5.20000
0.35824	4.08222	0.35824	5.20000
0.36262	4.08266	0.36262	5.20000
0.36700	4.08310	0.36700	5.20000
0.37138	4.08354	0.37138	5.20000
0.37575	4.08397	0.37575	5.20000
0.38013	4.08440	0.38013	5.20000
0.38451	4.08483	0.38451	5.20000
0.38889	4.08526	0.38889	5.20000
0.39326	4.08568	0.39326	5.20000
0.39764	4.08610	0.39764	5.20000
0.40202	4.08652	0.40202	5.20000
0.40640	4.08693	0.40640	5.20000
0.41078	4.08735	0.41078	5.20000
0.41515	4.08776	0.41515	5.20000
0.41953	4.08816	0.41953	5.20000
0.42391	4.08857	0.42391	5.20000
0.42829	4.08897	0.42829	5.20000
0.43266	4.08937	0.43266	5.20000
0.43704	4.08977	0.43704	5.20000
0.44142	4.09016	0.44142	5.20000
0.44450	4.09044	0.44450	5.20000
0.45017	4.09094	0.45017	5.20000
0.45455	4.09133	0.45455	5.20000
0.45893	4.09171	0.45893	5.20000
0.46331	4.09210	0.46331	5.20000
0.46768	4.09247	0.46768	5.20000
0.47206	4.09285	0.47206	5.20000
0.47644	4.09322	0.47644	5.20000
0.48082	4.09359	0.48082	5.20000
0.48520	4.09396	0.48520	5.20000
0.48957	4.09433	0.48957	5.20000
0.49395	4.09469	0.49395	5.20000
0.49833	4.09505	0.49833	5.20000
0.50271	4.09541	0.50271	5.20000
0.50708	4.09576	0.50708	5.20000
0.51146	4.09611	0.51146	5.20000
0.51584	4.09647	0.51584	5.20000
0.52022	4.09681	0.52022	5.20000
0.52459	4.09716	0.52459	5.20000
0.52897	4.09750	0.52897	5.20000
0.53335	4.09784	0.53335	5.20000
0.53773	4.09816	0.53773	5.20000
0.54210	4.09851	0.54210	5.20000
0.54648	4.09884	0.54648	5.20000
0.55086	4.09917	0.55086	5.20000
0.55524	4.09950	0.55524	5.20000
0.55962	4.09982	0.55962	5.20000
0.56399	4.10014	0.56399	5.20000
0.56837	4.10046	0.56837	5.20000
0.57275	4.10078	0.57275	5.20000
0.57713	4.10109	0.57713	5.20000
0.58150	4.10140	0.58150	5.20000

0.56588	4.10171	0.56588	5.20000
0.59026	4.10202	0.59026	5.20000
0.59464	4.10232	0.59464	5.20000
0.59901	4.10262	0.59901	5.20000
0.60339	4.10292	0.60339	5.20000
0.60777	4.10321	0.60777	5.20000
0.61215	4.10351	0.61215	5.20000
0.61653	4.10380	0.61653	5.20000
0.62090	4.10408	0.62090	5.20000
0.62528	4.10437	0.62528	5.20000
0.62966	4.10465	0.62966	5.20000
0.63404	4.10493	0.63404	5.20000
0.63841	4.10521	0.63841	5.20000
0.64279	4.10548	0.64279	5.20000
0.64717	4.10575	0.64717	5.20000
0.65155	4.10602	0.65155	5.20000
0.65592	4.10629	0.65592	5.20000
0.66030	4.10656	0.66030	5.20000
0.66468	4.10682	0.66468	5.20000
0.66906	4.10708	0.66906	5.20000
0.67343	4.10733	0.67343	5.20000
0.67781	4.10759	0.67781	5.20000
0.68219	4.10784	0.68219	5.20000
0.68657	4.10809	0.68657	5.20000
0.69095	4.10833	0.69095	5.20000
0.69532	4.10858	0.69532	SEE IV TD
0.69970	4.10882	0.69970	SEE IV TD
0.70408	4.10906	0.70408	SEE IV TD
0.70846	4.10929	0.70846	SEE IV TD
0.71283	4.10953	0.71283	SEE IV TD
0.71721	4.10976	0.71721	SEE IV TD
0.72159	4.10999	0.72159	SEE IV TD
0.72597	4.11021	0.72597	SEE IV TD
0.73034	4.11043	0.73034	SEE IV TD
0.73472	4.11066	0.73472	SEE IV TD
0.73910	4.11087	0.73910	SEE IV TD
0.74348	4.11109	0.74348	SEE IV TD
0.74786	4.11130	0.74786	SEE IV TD
0.75223	4.11151	0.75223	SEE IV TD
0.75661	4.11172	0.75661	SEE IV TD
0.76099	4.11192	0.76099	SEE IV TD
0.76537	4.11212	0.76537	SEE IV TD
0.76974	4.11233	0.76974	SEE IV TD
0.77412	4.11252	0.77412	SEE IV TD
0.77850	4.11272	0.77850	SEE IV TD
0.78288	4.11291	0.78288	SEE IV TD
0.78725	4.11310	0.78725	SEE IV TD
0.79163	4.11328	0.79163	SEE IV TD
0.79601	4.11347	0.79601	SEE IV TD
0.80039	4.11365	0.80039	SEE IV TD
0.80476	4.11383	0.80476	SEE IV TD
0.80914	4.11401	0.80914	SEE IV TD
0.81352	4.11418	0.81352	SEE IV TD
0.81790	4.11435	0.81790	SEE IV TD
0.82228	4.11452	0.82228	SEE IV TD

0.82665	4.11469	0.82665	SEE IV TD
0.83103	4.11485	0.83103	SEE IV TD
0.83541	4.11501	0.83541	SEE IV TD
0.83979	4.11517	0.83979	SEE IV TD
0.84416	4.11533	0.84416	SEE IV TD
0.84854	4.11548	0.84854	SEE IV TD
0.85292	4.11563	0.85292	SEE IV TD
0.85730	4.11576	0.85730	SEE IV TD
0.86167	4.11592	0.86167	SEE IV TD
0.86605	4.11607	0.86605	SEE IV TD
0.87043	4.11621	0.87043	SEE IV TD
0.87070	4.11622		IV S.L. (ADDED BY D.M. ROSS)
0.87481	4.11635	0.87481	SEE IV TD
0.87919	4.11646	0.87919	SEE IV TD
0.88356	4.11662	0.88356	SEE IV TD
0.88794	4.11674	0.88794	SEE IV TD
0.89232	4.11687	0.89232	SEE IV TD
0.89670	4.11700	0.89670	SEE IV TD
0.90107	4.11712	0.90107	SEE IV TD
0.90545	4.11724	0.90545	SEE IV TD
0.90983	4.11736	0.90983	SEE IV TD
0.91421	4.11748	0.91421	SEE IV TD
0.91858	4.11759	0.91858	SEE IV TD
0.92296	4.11770	0.92296	SEE IV TD
0.92734	4.11780	0.92734	SEE IV TD
0.93172	4.11791	0.93172	SEE IV TD
0.93609	4.11801	0.93609	SEE IV TD
0.94047	4.11811	0.94047	SEE IV TD
0.94485	4.11821	0.94485	SEE IV TD
0.94923	4.11830	0.94923	SEE IV TD
0.95361	4.11839	0.95361	SEE IV TD
0.95798	4.11848	0.95798	SEE IV TD
0.96236	4.11857	0.96236	SEE IV TD
0.96674	4.11866	0.96674	SEE IV TD
0.97112	4.11874	0.97112	SEE IV TD
0.97549	4.11891	0.97549	SEE IV TD
0.97987	4.11899	0.97987	SEE IV TD
0.98425	4.11897	0.98425	SEE IV TD
0.98863	4.11904	0.98863	SEE IV TD
0.99300	4.11910	0.99300	SEE IV TD
0.99738	4.11917	0.99738	SEE IV TD
1.00176	4.11924	1.00176	SEE IV TD
1.00614	4.11920	1.00614	SEE IV TD
1.01051	4.11936	1.01051	SEE IV TD
1.01489	4.11941	1.01489	SEE IV TD
1.02365	4.11952	1.02365	SEE IV TD
1.02802	4.11957	1.02802	SEE IV TD
1.03240	4.11961	1.03240	SEE IV TD
1.03678	4.11966	1.03678	SEE IV TD
1.04116	4.11969	1.04116	SEE IV TD
1.04553	4.11973	1.04553	SEE IV TD
1.04991	4.11977	1.04991	SEE IV TD
1.05429	4.11980	1.05429	SEE IV TD
1.05867	4.11983	1.05867	SEE IV TD

SSME FT.....MAL INLET STRUT FAIRING...R.J.ROMEY...8-19-87...USE SH F
 OPERATING CONDITION 1 109 PCT. R.J.ROMEY...
 MAE = 159.0 MM. 3 0.0 MM. 3 0.0 MGT = 0.0

ZS	RADIUS	SIG P/A	SHRD P/A	LE	TE	CONV
0	3.0000	0.	0.	0.	0.	0.
10	3.2200	0.	0.	1642.	-1907.	-512.
20	3.4400	0.	0.	2919.	-3390.	-910.
30	3.6600	0.	0.	3831.	-6449.	-1194.
40	3.8800	0.	0.	6378.	-5085.	-1365.
50	4.1000	0.	0.	4561.	-5297.	-1422.
60	4.3200	0.	0.	4370.	-5095.	-1365.
70	4.5400	0.	0.	3831.	-6449.	-1194.
80	4.7600	0.	0.	2919.	-3390.	-910.
90	4.9800	0.	0.	1642.	-1907.	-512.
100	5.2000	0.	0.	0.	0.	0.

ZS	RADIUS	XOFF	YOFF	LE	TE	CONV
0	3.0000	0.0	0.0	0.	0.	0.
10	3.2200	0.0	0.0	1642.	-1907.	-512.
20	3.4400	0.0	0.0	2919.	-3390.	-910.
30	3.6600	0.0	0.0	3831.	-6449.	-1194.
40	3.8800	0.0	0.0	4378.	-5085.	-1365.
50	4.1000	0.0	0.0	4561.	-5297.	-1422.
60	4.3200	0.0	0.0	4370.	-5095.	-1365.
70	4.5400	0.0	0.0	3831.	-6449.	-1194.
80	4.7600	0.0	0.0	2919.	-3390.	-910.
90	4.9800	0.0	0.0	1642.	-1907.	-512.
100	5.2000	0.0	0.0	0.	0.	0.

ZS	RADIUS	AREA	PULL	LE	TE	CONV
0	3.0000	0.3156	0.0	0.	0.	0.
10	3.2200	0.3156	0.0	0.	0.	0.
20	3.4400	0.3156	0.0	0.	0.	0.
30	3.6600	0.3156	0.0	0.	0.	0.
40	3.8800	0.3156	0.0	0.	0.	0.
50	4.1000	0.3156	0.0	0.	0.	0.
60	4.3200	0.3156	0.0	0.	0.	0.
70	4.5400	0.3156	0.0	0.	0.	0.
80	4.7600	0.3156	0.0	0.	0.	0.
90	4.9800	0.3156	0.0	0.	0.	0.
100	5.2000	0.3156	0.0	0.	0.	0.

ZS	RADIUS	MGT	MYT	MGS	MYG	THETAN
0	3.0000	0.0	0.0	0.0	0.0	0.0
10	3.2200	0.0	0.0	0.0	287.0	0.0
20	3.4400	0.0	0.0	0.0	510.1	0.0
30	3.6600	0.0	0.0	0.0	669.6	0.0
40	3.8800	0.0	0.0	0.0	765.2	0.0
50	4.1000	0.0	0.0	0.0	797.1	0.0
60	4.3200	0.0	0.0	0.0	765.2	0.0
70	4.5400	0.0	0.0	0.0	669.6	0.0
80	4.7600	0.0	0.0	0.0	510.1	0.0
90	4.9800	0.0	0.0	0.0	287.0	0.0
100	5.2000	0.0	0.0	0.0	0.0	0.0

SSME FT.... JAL INLET STRUT FAIRING...R.J.RONEY...8-19-87...USE SH F
 DENSITY = 0.31100 WEIGHTING RADIU INNER = 3.0000 OUTER = 5.2000
 SHROUD VOLUME = 0.0 SHROUD THICKNESS = 0.0
 SHROUD MISALIGNMENT = 0.0 RADIUS OF SHROUD = 0.0
 WEIGHT OF AIRFOIL = 0.21596 HEIGHT OF SHROUD = 0.0
 TOTAL WEIGHT = 0.86386 NUMBER OF VANES = 4

SUMMARY OF SECTION PROPERTIES

/S	RADIUS	AREA	I MIN	I MAX	THETA	XBAR	YBAR
0	3.0000	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000
10	3.2200	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000
20	3.4400	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000
30	3.6600	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000
40	3.8800	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000
50	4.1000	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000
60	4.3200	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000
70	4.5400	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000
80	4.7600	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000
90	4.9800	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000
100	5.2000	0.3156	0.1784E-01	0.2035E+00	0.00	-0.0001	-0.0000

/S	RADIUS	K	L	MAX T	AX.MIDTH	C1	C2
0	3.0000	0.0		0.8655E-01	0.3535	2.7000	0.1435
10	3.2200	0.0		0.8655E-01	0.3535	2.7000	0.1435
20	3.4400	0.0		0.8655E-01	0.3535	2.7000	0.1435
30	3.6600	0.0		0.8655E-01	0.3535	2.7000	0.1435
40	3.8800	0.0		0.8655E-01	0.3535	2.7000	0.1435
50	4.1000	0.0		0.8655E-01	0.3535	2.7000	0.1435
60	4.3200	0.0		0.8655E-01	0.3535	2.7000	0.1435
70	4.5400	0.0		0.8655E-01	0.3535	2.7000	0.1435
80	4.7600	0.0		0.8655E-01	0.3535	2.7000	0.1435
90	4.9800	0.0		0.8655E-01	0.3535	2.7000	0.1435
100	5.2000	0.0		0.8655E-01	0.3535	2.7000	0.1435

/S	RADIUS	C3	CLE	CTE	C4	ALPHA_B	B
0	3.0000	0.3537	1.1643	1.3521	0.3629	89.99	2.7000
10	3.2200	0.3537	1.1643	1.3521	0.3629	89.99	2.7000
20	3.4400	0.3537	1.1643	1.3521	0.3629	89.99	2.7000
30	3.6600	0.3537	1.1643	1.3521	0.3629	89.99	2.7000
40	3.8800	0.3537	1.1643	1.3521	0.3629	89.99	2.7000
50	4.1000	0.3537	1.1643	1.3521	0.3629	89.99	2.7000
60	4.3200	0.3537	1.1643	1.3521	0.3629	89.99	2.7000
70	4.5400	0.3537	1.1643	1.3521	0.3629	89.99	2.7000
80	4.7600	0.3537	1.1643	1.3521	0.3629	89.99	2.7000
90	4.9800	0.3537	1.1643	1.3521	0.3629	89.99	2.7000
100	5.2000	0.3537	1.1643	1.3521	0.3629	89.99	2.7000

P824 UTILITY PROGRAM - STRESS CALCULATION

SSME FT...FINAL INLET STRUT FAIRING...R.J.RONEY...8-19-87...USE SH F

ENGINE OPERATING CONDITION

MAF RPM

TITLE

1	159.0	0	109 PCT.	R.J.RONEY...
XGBR =	0.0	XGBM =	0.0	XGBT = 0.0
YGBR =	0.0	YGBM =	797.10010	YGBT = 0.0
DENSITY =	0.11100	WEIGHTING RADIU INNER =	3.0000	OUTER = 5.2000
SHROUD VOLUME =	0.0	SHROUD THICKNESS =	0.0	
SHROUD MISALIGNMENT =	0.0	RADIUS OF SHROUD =	0.0	

SSME ET FINAL INLET STRUT FAIRING R.J. ROWE

STRESS VS. SPAN

WAE = 459.0

ROM = 0.

PULL = 0.

DENS = 0.31100

1 SIC PYR SHROUD
2 SIC PYR FOIL+SHROUD
3 SIC PYR - SIC SHMIS
4 SIC PYR - SIC SHMIS - SIC 3B
5 SIC PYR - SIC SHMIS - SIC 4B

30

CONDITION

109 PCT. R.J. ROWEY

STRESS A

% SPAN BASED ON

WEIGHT RADII

RADI = 31.0000

RADI = 51.2000

STRESS
KSI

10

20

30

40

50

60

70

80

90

100

0

10

20

30

40

50

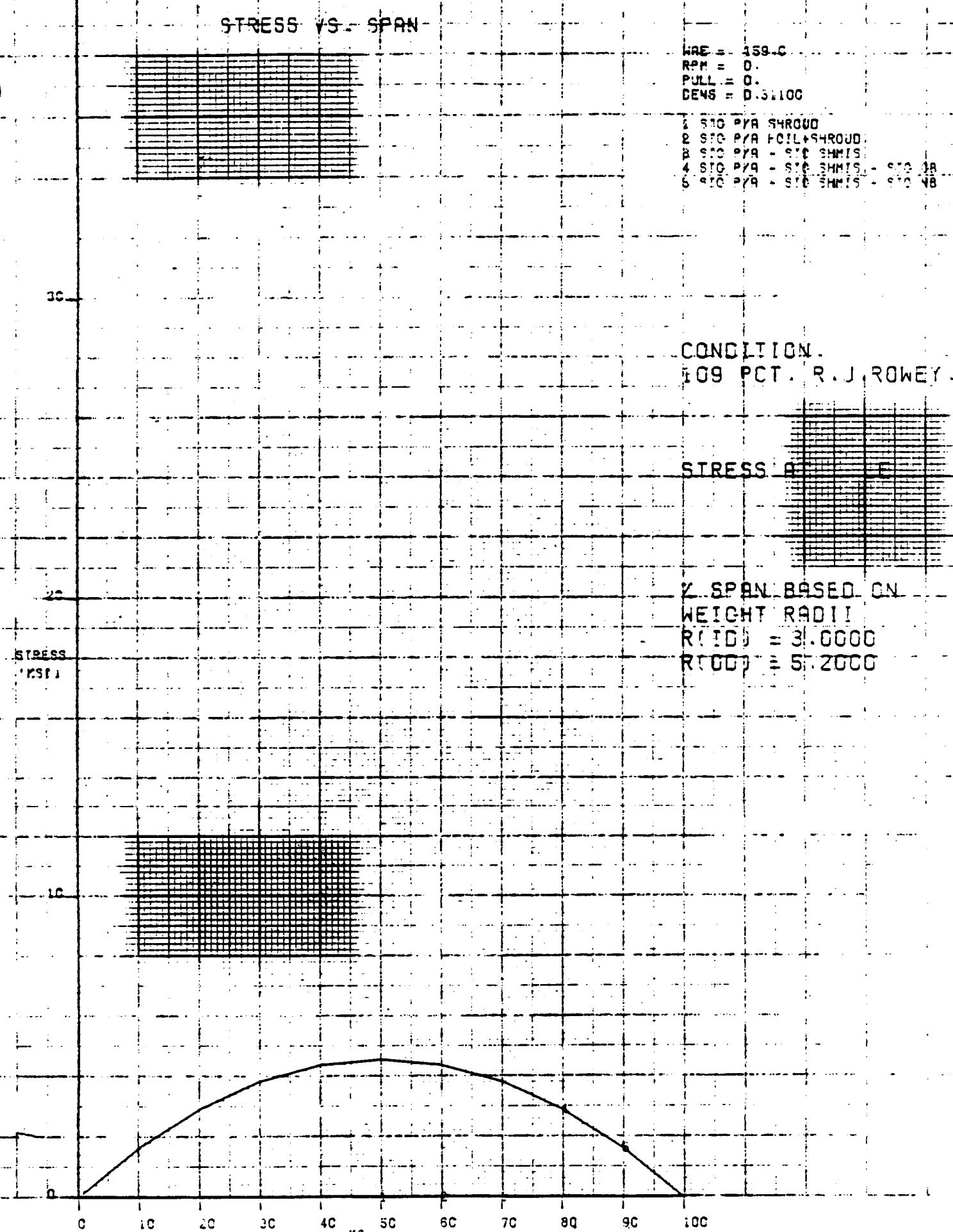
60

70

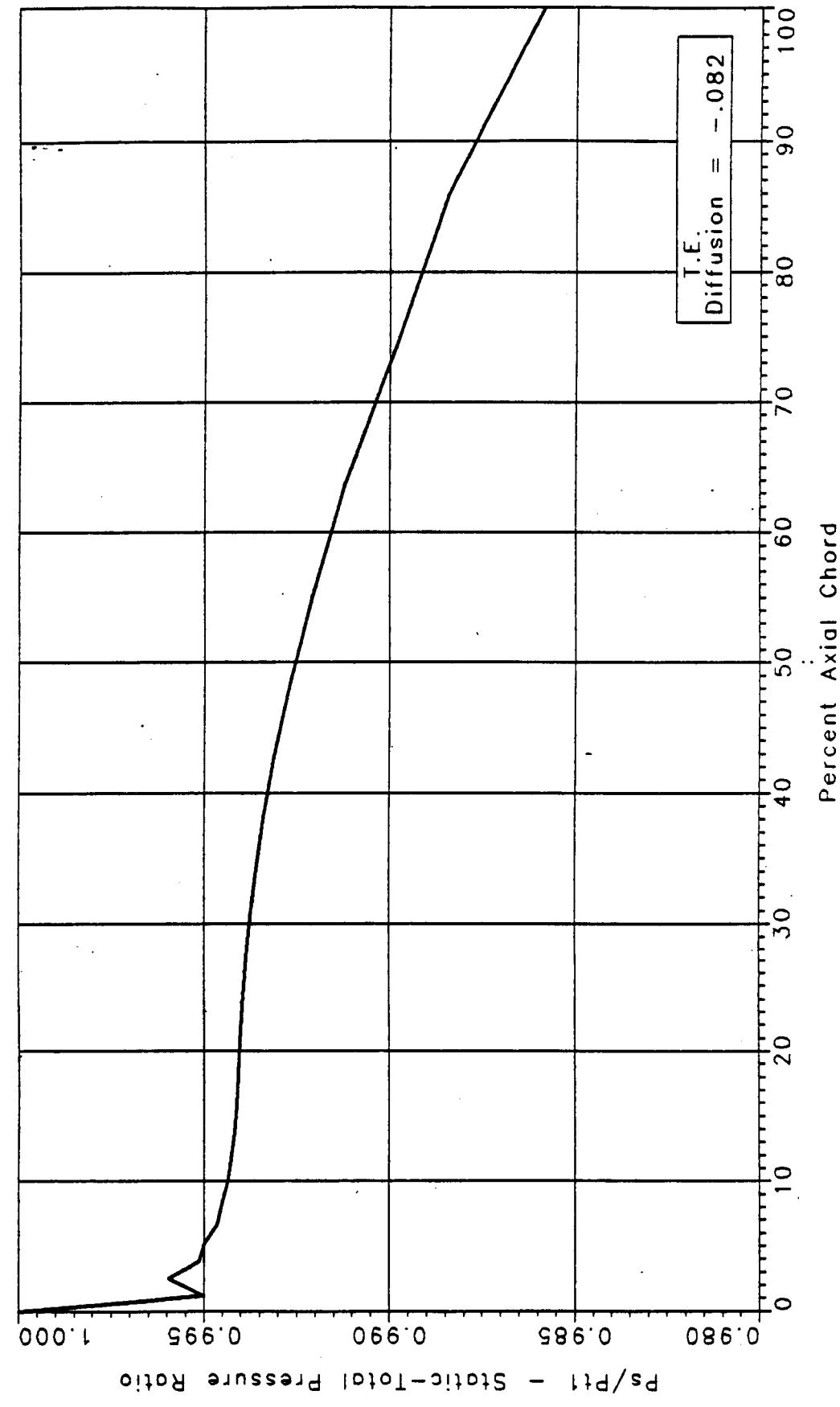
80

90

100



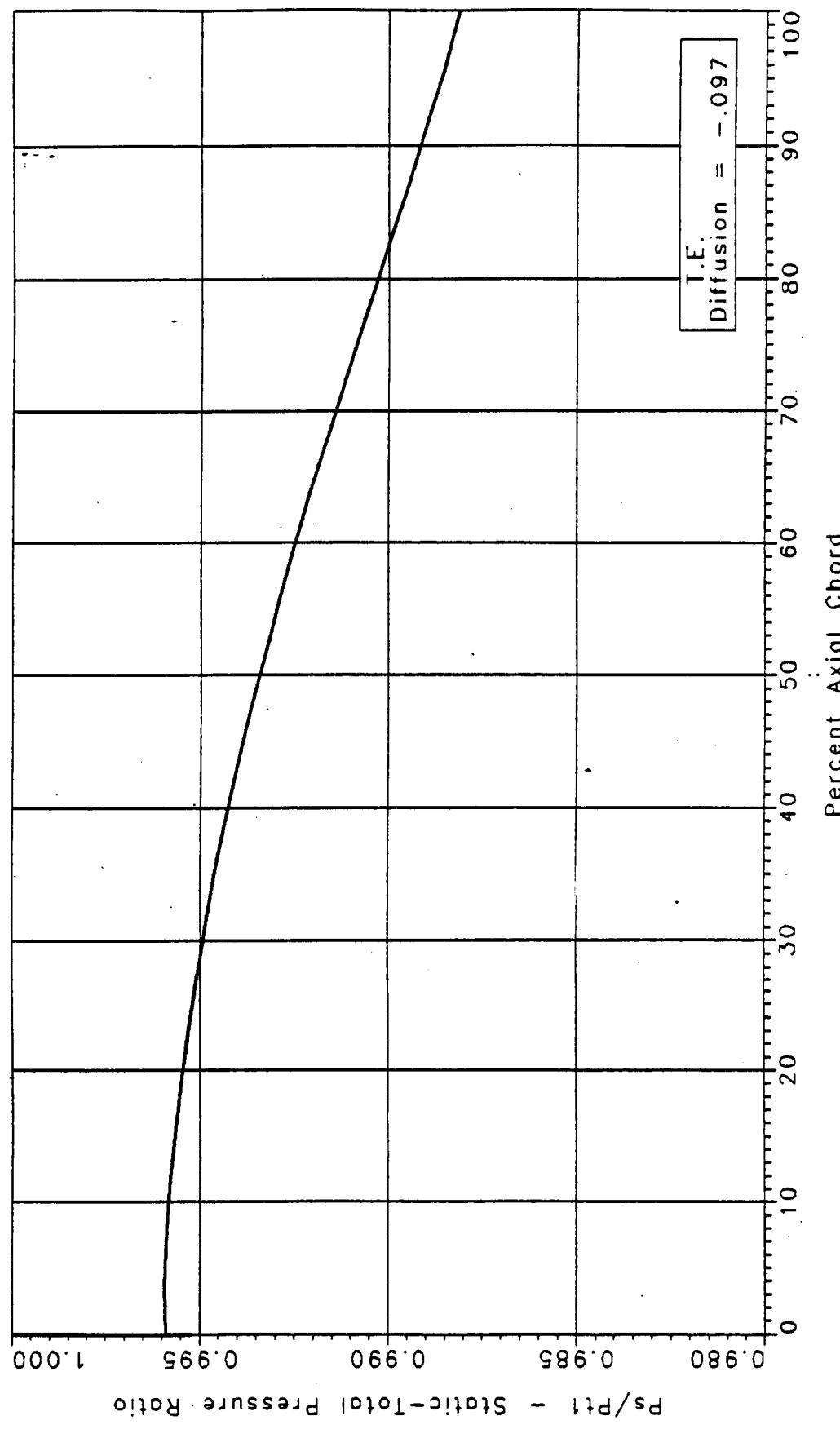
PRATT & WHITNEY
SSME ATD Fuel Pump Turbine
3-D Pressure Distribution "C" - Mesh
Generated Poisson



08/26/87
DLS

PRATT & WHITNEY
 SSME ATD Fuel Pump Turbine
 3-D Pressure Distribution "C" - Mesh
 Poisson Generated

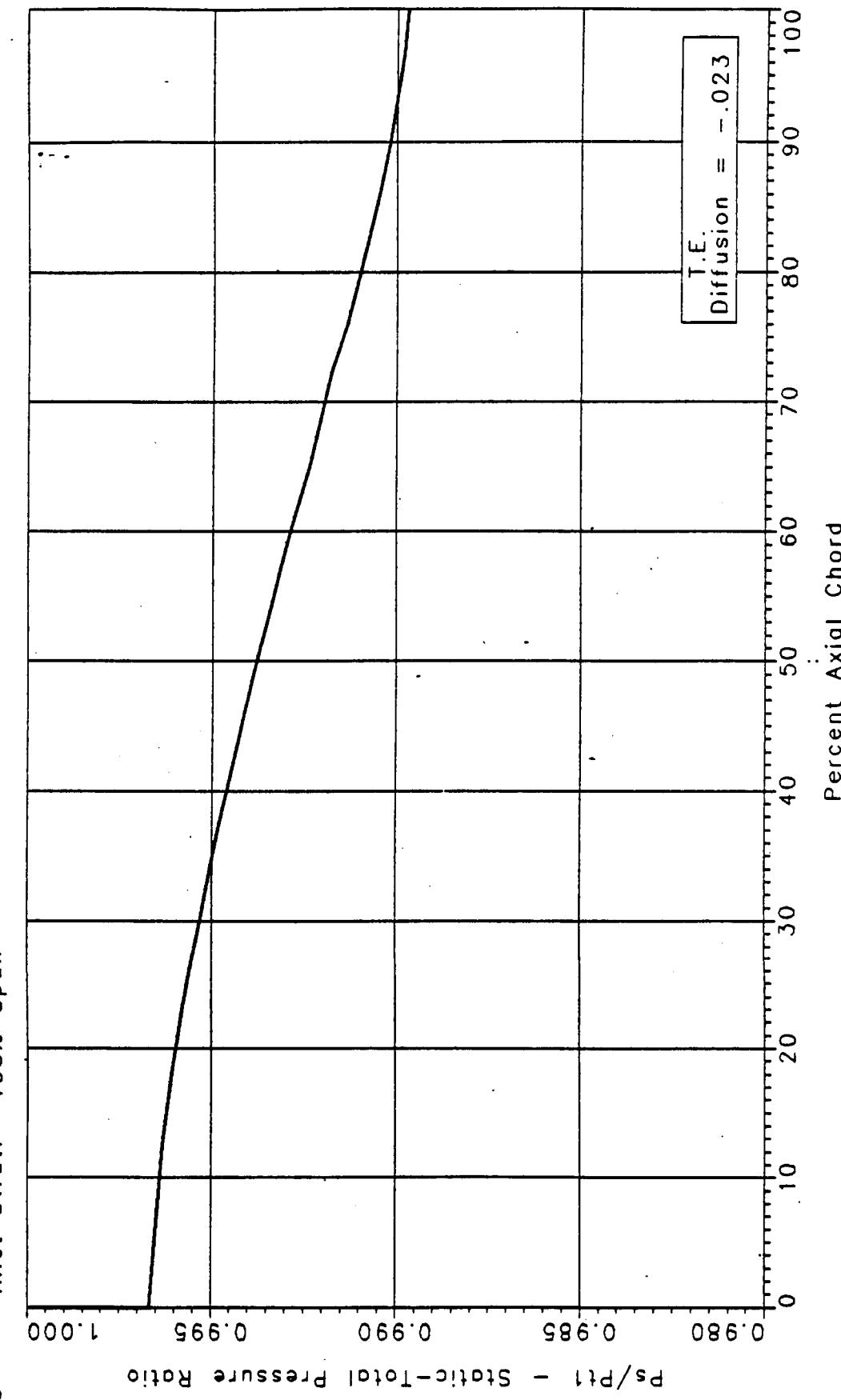
Inlet Strut: 50% Span



08/26/87
DLS

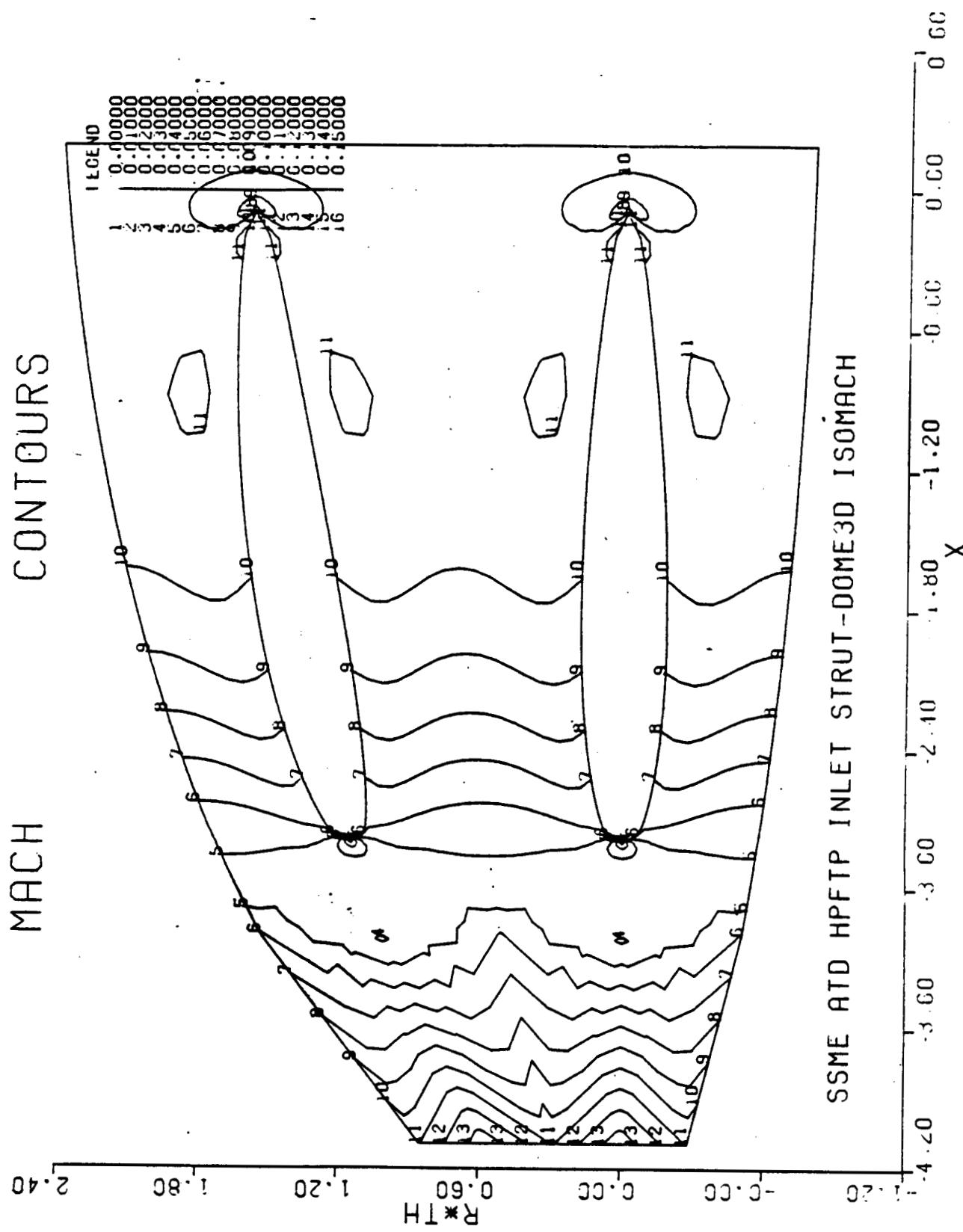
75

PRATT & WHITNEY
SSME ATD Fuel Pump Turbine
3-D Pressure Distribution (V310)
Poisson Generated "C" - Mesh



08/26/87
DLS

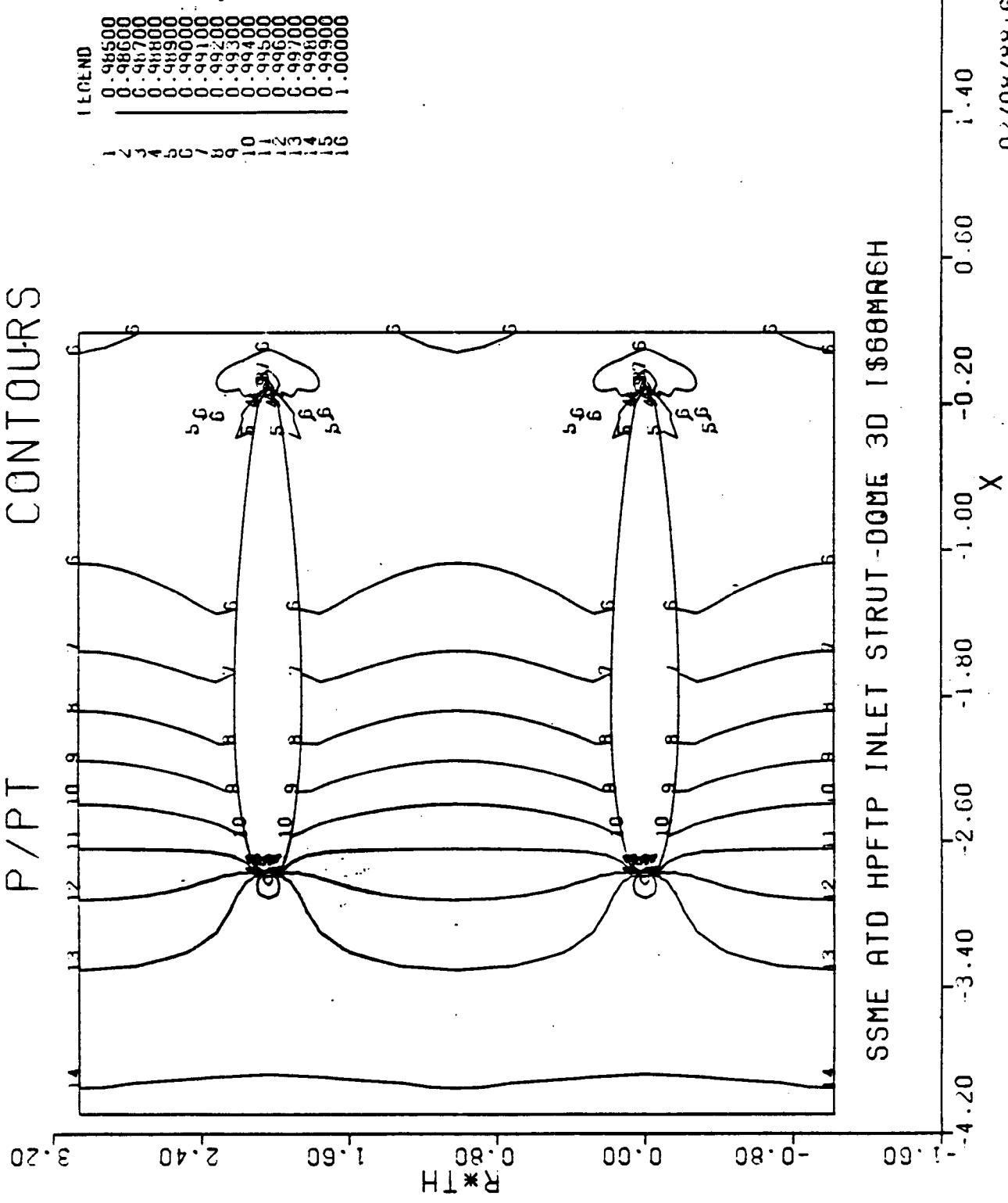
MACH CONTOURS



KSI ICE= 1 NI 3D CYLINDRICAL C-GRID INLET STRUT... R. J. ROWLEY... 01-05-88... R.

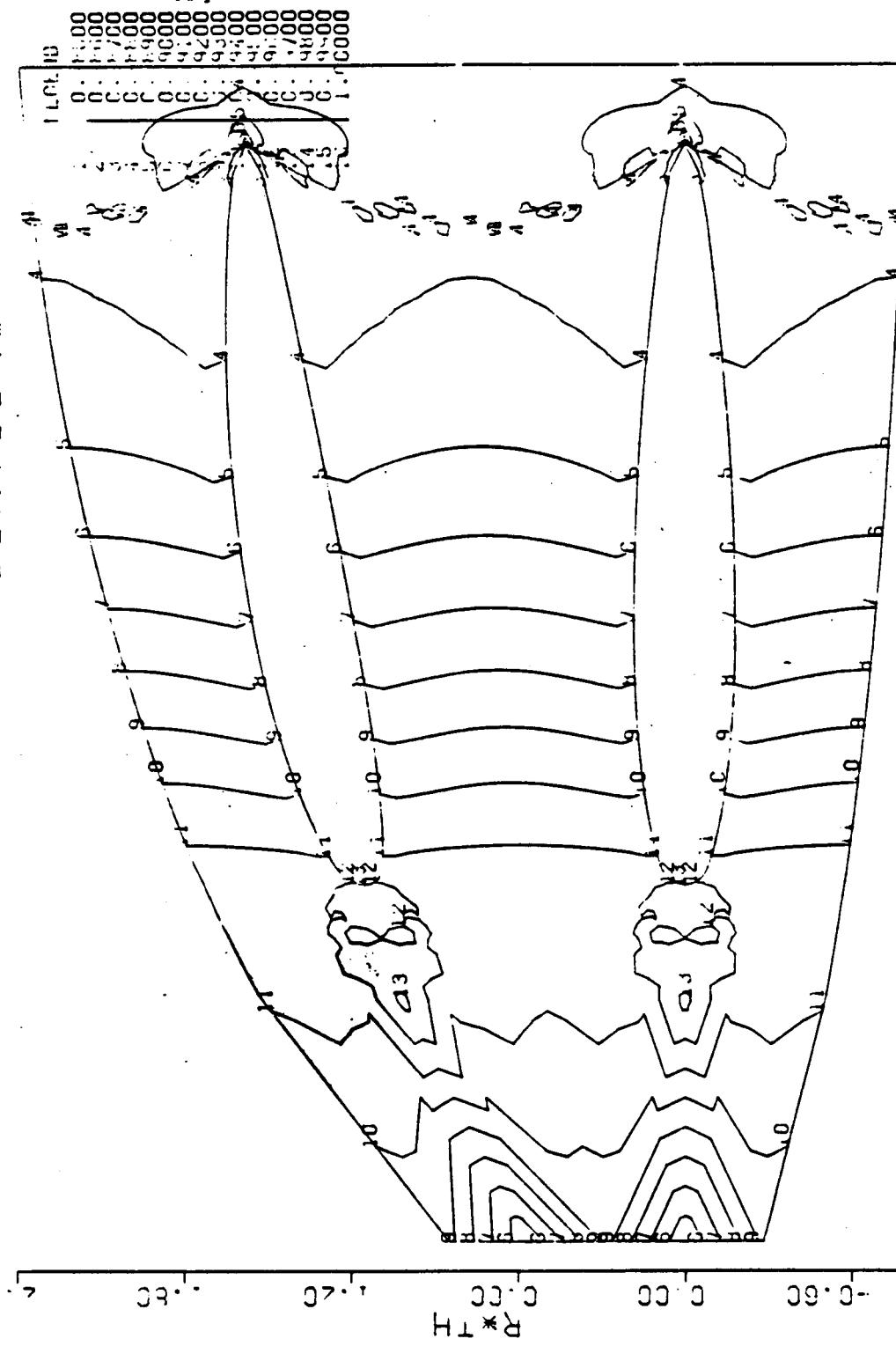
02/08/88 15.58 .26

P / P_T CONTOURS



P / P_T

CONTOURS

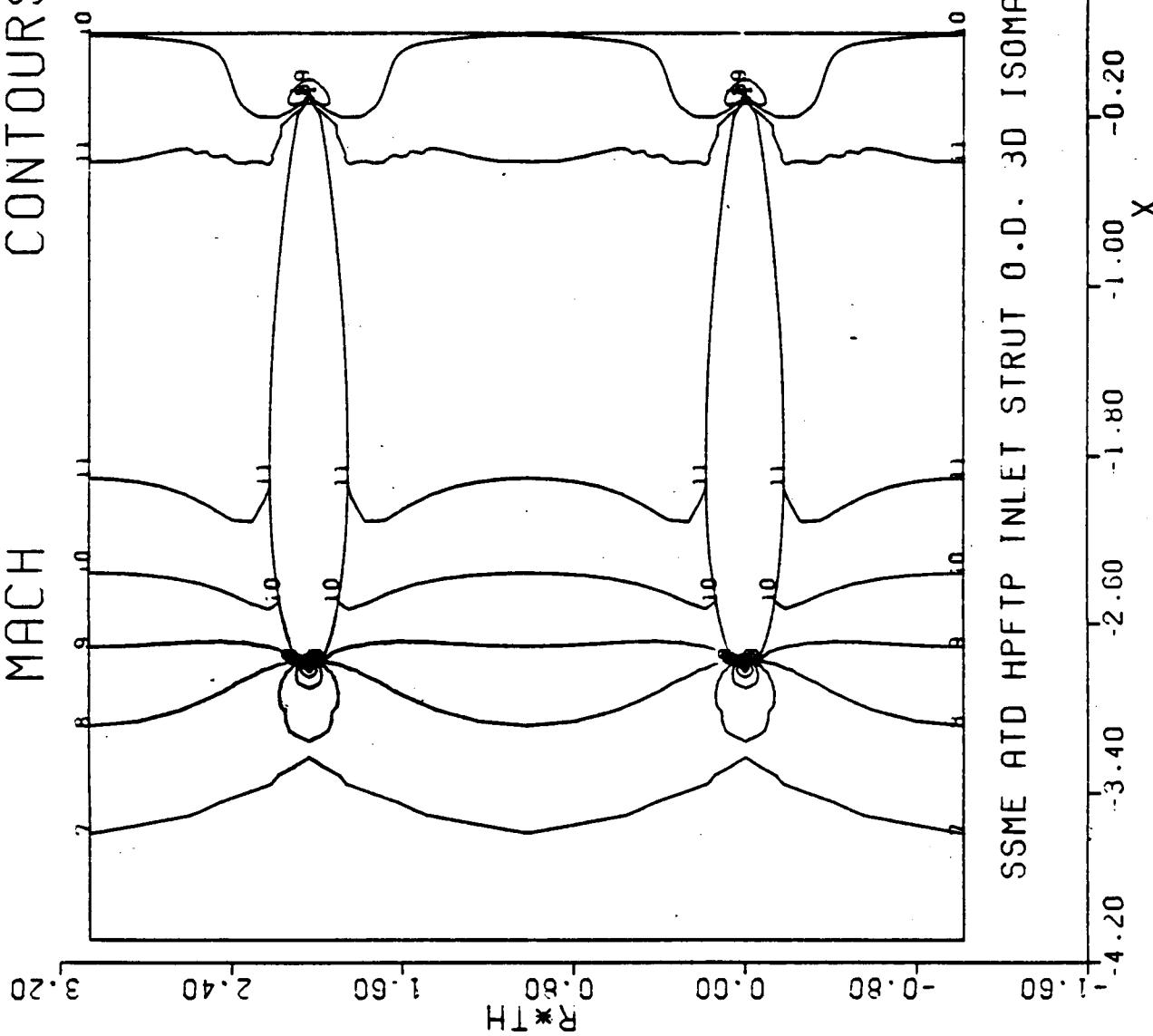


SSME ATD HPF TP INLET STRUT DOME 3D ISOBARS

X R^{*}T / θ 0.40 -0.40 0.00 -0.40 0.40

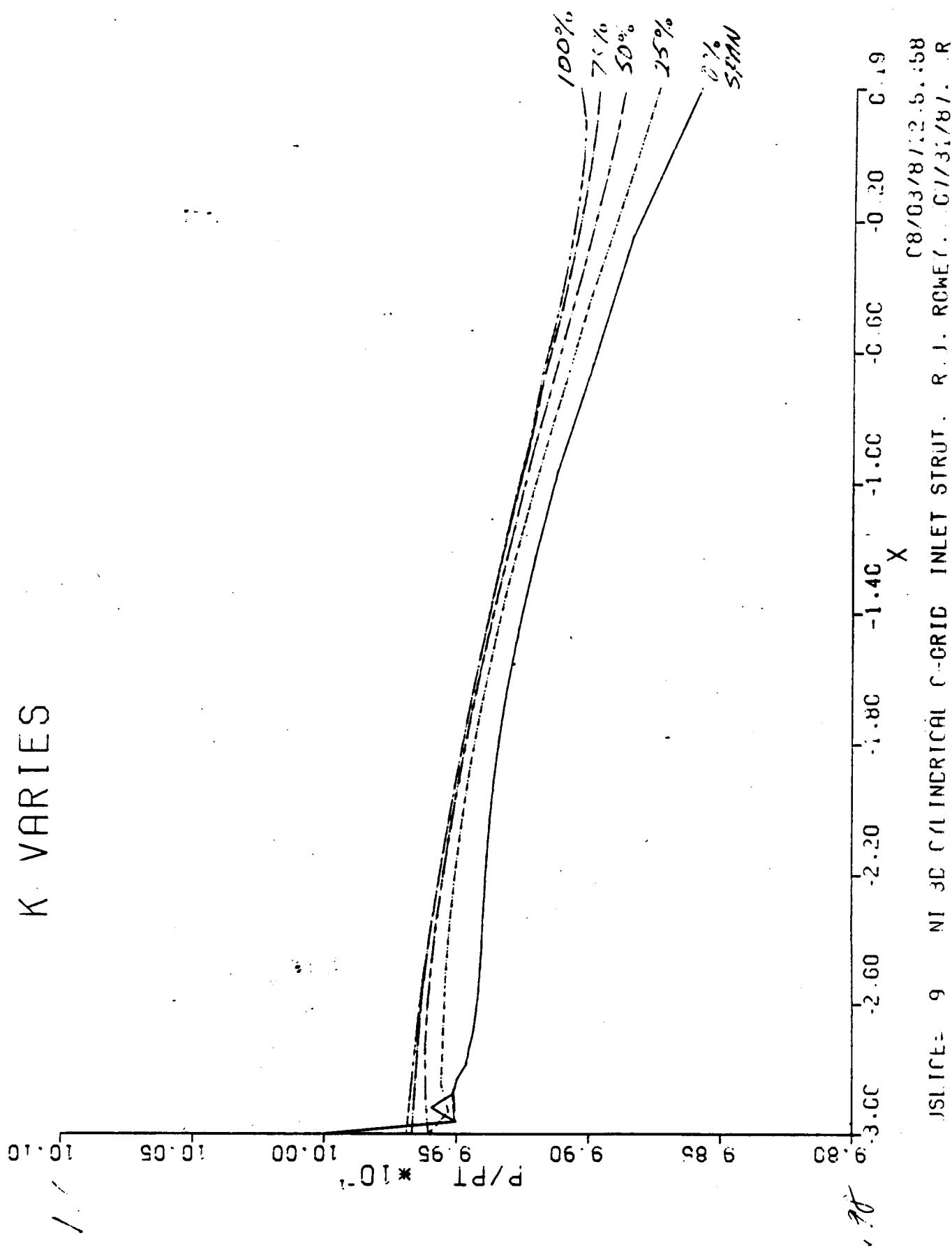
X R^{*}T / θ 0.40 -0.40 0.00 -0.40 0.40

MACH CONTOURS



KST I CT= 9 NI 3D CYLINDRICAL C-GRID INLET STRUT.. R. J. ROWLEY.. 01-05-88 R
02/08/88 16:07:56

K-VARIABLES



U456 - FINITE TRANSITION INTEGRAL BOUNDARY LAYER DECK

DATE 07/29/87 TIME 10:35:21

INLET STAG FLOW REYNOLDS 06/11/87. .RJ

REFUEL 2 1560 RPS. 198 RTE= 3.98

4.002 TU

INLET EXIT

MACH NO. 0.056 0.116

GAS ANGLES 90.01 90.00

REF. REYNOLDS NO. *****

PRESSURE SIDE

0.0100

0.0090

0.0080

0.0070

0.0060

0.0050

0.0040

0.0030

0.0020

0.0010

0.0000

0.0

1.0

2.0

3.0

4.0

S DISTANCE (INCHES)

TRANSITION CHART

0.0

1.0

2.0

3.0

4.0

S DISTANCE (INCHES)

U456 - FINITE TRANSITION INTEGRAL BOUNDARY LAYER DECK

DATE 07/29/87 TIME 10:39:29

INLET STRUT P.L. MONEY 06/11/87 R.J.

RFUEL2 LF50 RTE 2.75 RTE= 4.28

4.002 TU

INLET

EXIT

MACH NO. 0.062

0.113

GAS ANGLES 90.00

90.00

PRESSURE SIDE

REF. REYNOLDS NO.

9375974

0.0100

0.0090

0.0080

0.0070

0.0060

0.0050

0.0040

0.0030

0.0020

0.0010

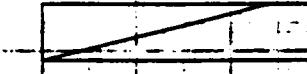
0.0000

FRONT COIL

0.0 1.0 2.0 3.0 4.0

S DISTANCE (INCHES)

TRANSITION CHART



0.0 1.0 2.0 3.0 4.0

S DISTANCE (INCHES)

U456 - FINITE TRANSITION INTEGRAL BOUNDARY LAYER DECK

DATE 07/29/87

TIME 10:53:20

INLET STRUT: R.J. RENEY.. 06/11/87.. RJ

RFUEL2.U760.EIF S= 20 RIE= 5.20

4.00% TU

INLET

EXIT

MACH NO. 0.059

0.106

GAS ANGLES 90.00

90.00

PRESSURE SIDE

REF. REYNOLDS NO. 9929177

0.0100

0.0090

0.0080

0.0070

0.0060

0.0050

0.0040

0.0030

0.0020

0.0010

0.0

0.0

1.0

2.0

3.0

4.0

S DISTANCE (INCHES)

TRANSITION CHART



0.0

1.0

2.0

3.0

4.0

S DISTANCE (INCHES)

U456 - FINITE TRANSITION INTEGRAL BOUNDARY LAYER DECK

DATE 07/29/87

TIME 10:42:19

INLET STATION NUMBER... 06/11/87... RU

RFUEL2 U760 RIF= 3.56 RTE= 4.58

4.002 TU

INLET EXIT

MACH NO. 0.059 0.111

GAS ANGLES 90.00 90.00

PRESSURE SIDE

REF. REYNOLDS NO. 8700571

0.0100

0.0090

0.0080

0.0070

0.0060

0.0050

0.0040

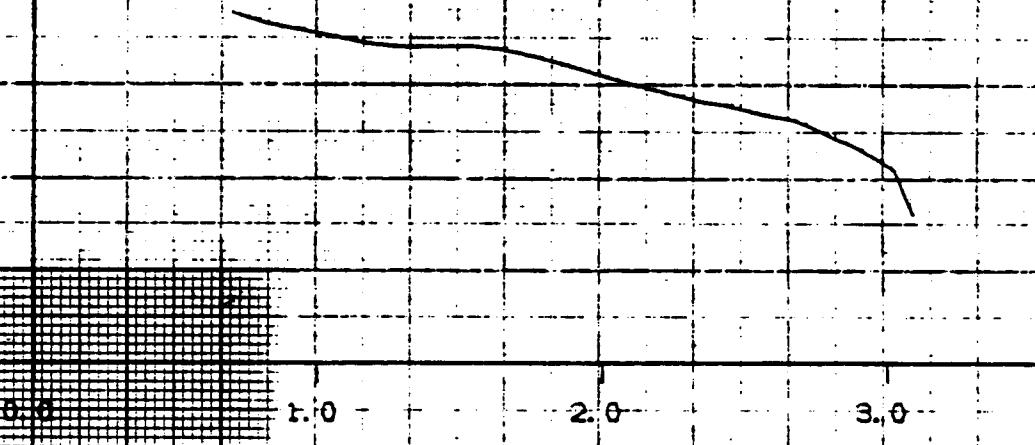
0.0030

0.0020

0.0010

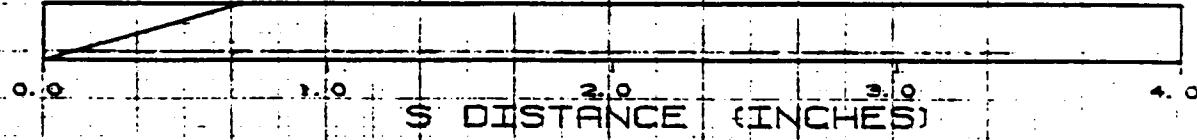
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UPWASH



S DISTANCE (INCHES)

TRANSITION CHART



U456 - FINITE TRANSITION INTEGRAL BOUNDARY LAYER DECK

DATE - 07/29/87

TIME - 10:47:23

INLET STRUT: REYNOLDS - 06/11/87... RJ

REFUEL2 LF760 RIFL = 4.98 RIFL = 4.89

4.002 TUE

INLET EXIT

MACH NO. 0.058 0.108

GAS ANGLES 90.00 90.00

PRESSURE SIDE

REF. REYNOLDS NO. 8570625

0.0100

0.0080

0.0060

0.0050

0.0040

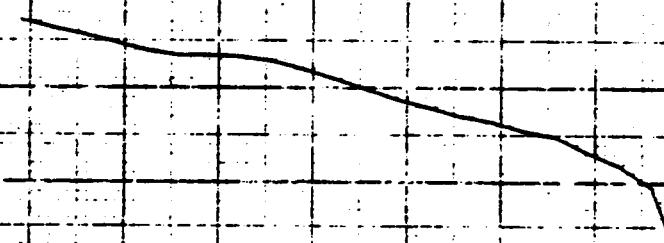
0.0030

0.0020

0.0010

0.0000

FRIC-COM



S DISTANCE (INCHES)

TRANSITION CHART

